ORDER NO. KM40707353CE
F13

Service Manual

Telephone Equipment

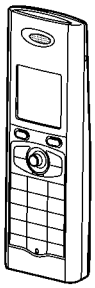
KX-TG8231B
KX-TG8232B
KX-TGA820B

Expandable Digital Cordless Answering System

Black Version
(for U.S.A.)

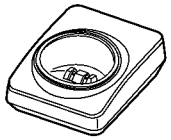
Caller ID Compatible

DECT 6.0



KX-TGA820B
(HANDSET)

KX-TG8231B
(BASE UNIT)



(CHARGER UNIT)

Configuration for each model

Model No	Base Unit	Handset	Charger Unit	Expandable
KX-TG8231	1 (TG8231)	1 (TGA820)		Up to 6
KX-TG8232	1 (TG8231)	2 (TGA820)	1	Up to 6
KX-TGA820*		1 (TGA820)	1	

* KX-TGA820 is also an optional accessory, which contains a handset and a charger.

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product, the printed circuit boards will be marked PbF. Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.
When this mark does appear, please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

- When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.
- The illustrations in this Service Manual may vary slightly from the actual product.

Note for TABLE OF CONTENTS:
Because sections 5, 6 and 7 of this manual are extracts from the operating instructions for this model, they are subject to change without notice. You can download and refer to the original operating instructions on TSN Server for further information.

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1 Safety Precautions

1.1. For Service Technicians

- **Repair service shall be provided in accordance with repair technology information such as service manual so as to prevent fires, injury or electric shock, which can be caused by improper repair work**.
  1. When repair services are provided, neither the products nor their parts or members shall be remodeled.
  2. If a lead wire assembly is supplied as a repair part, the entire lead wire assembly shall be replaced.
  3. FASTON terminals shall be plugged straight in and unplugged straight out.

- **ICs and LSIs are vulnerable to static electricity.**
  When repairing, the following precautions will help prevent recurring malfunctions.
  1. Cover plastic parts boxes with aluminum foil.
  2. Ground the soldering irons.
  3. Use a conductive mat on worktable.
  4. Do not grasp IC or LSI pins with bare fingers.

2 Warning

2.1. Battery Caution

1. Danger of explosion if battery is incorrectly replaced.
2. Replace only with the same or equivalent type recommended by the manufacturer.
3. Dispose of used batteries according to the manufacture's Instructions.

2.2. About Lead Free Solder (Pbf: Pb free)

Note:

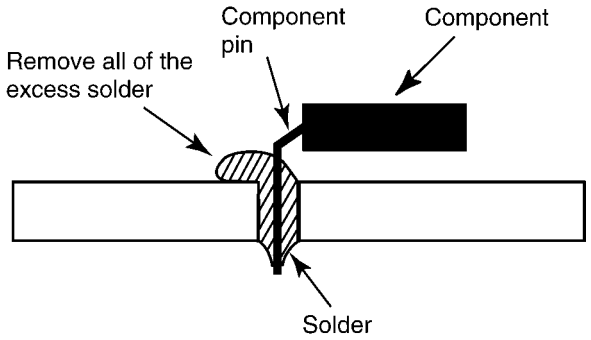
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver (Ag), and Copper (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder.

Caution

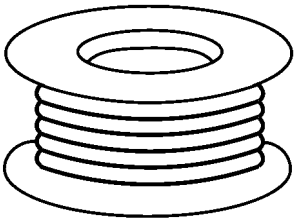
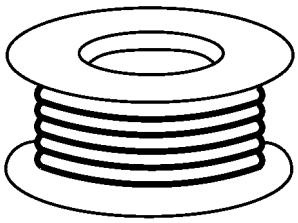
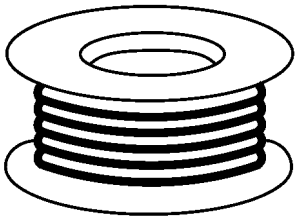
- PbF solder has a melting point that is 50 °F ~ 70 °F (30 °C ~ 40 °C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700 °F ± 20 °F (370 °C ± 10 °C).
- Exercise care while using higher temperature soldering irons.:
  Do not heat the PCB for too long time in order to prevent solder splash or damage to the PCB.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100 °F (600 °C).
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See the figure below).



(Slice View)

2.2.1. Suggested PbF Solder

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper (Sn+Ag+Cu), you can also use Tin and Copper (Sn+Cu) or Tin, Zinc, and Bismuth (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials.
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3 mm, 0.6 mm and 1.0 mm.

0.3 mm X 100 g	0.6 mm X 100 g	1.0 mm X 100 g
		

2.3. Discarding of P. C. Board

When discarding P. C. Board, delete all personal information such as telephone directory and caller list or scrap P. C. Board.

3 Specifications

■ **Standard:**
DECT 6.0 (Digital Enhanced Cordless Telecommunications 6.0)

■ **Number of channels:**
60 Duplex Channels

■ **Frequency range:**
1.92 GHz to 1.93 GHz

■ **Duplex procedure:**
TDMA (Time Division Multiple Access)

■ **Channel spacing:**
1,728 kHz

■ **Bit rate:**
1,152 kbit/s

■ **Modulation:**
GFSK (Gaussian Frequency Shift Keying)

■ **RF transmission power:**
Approx. 100 mW

■ **Voice coding:**
ADPCM 32 kbit/s

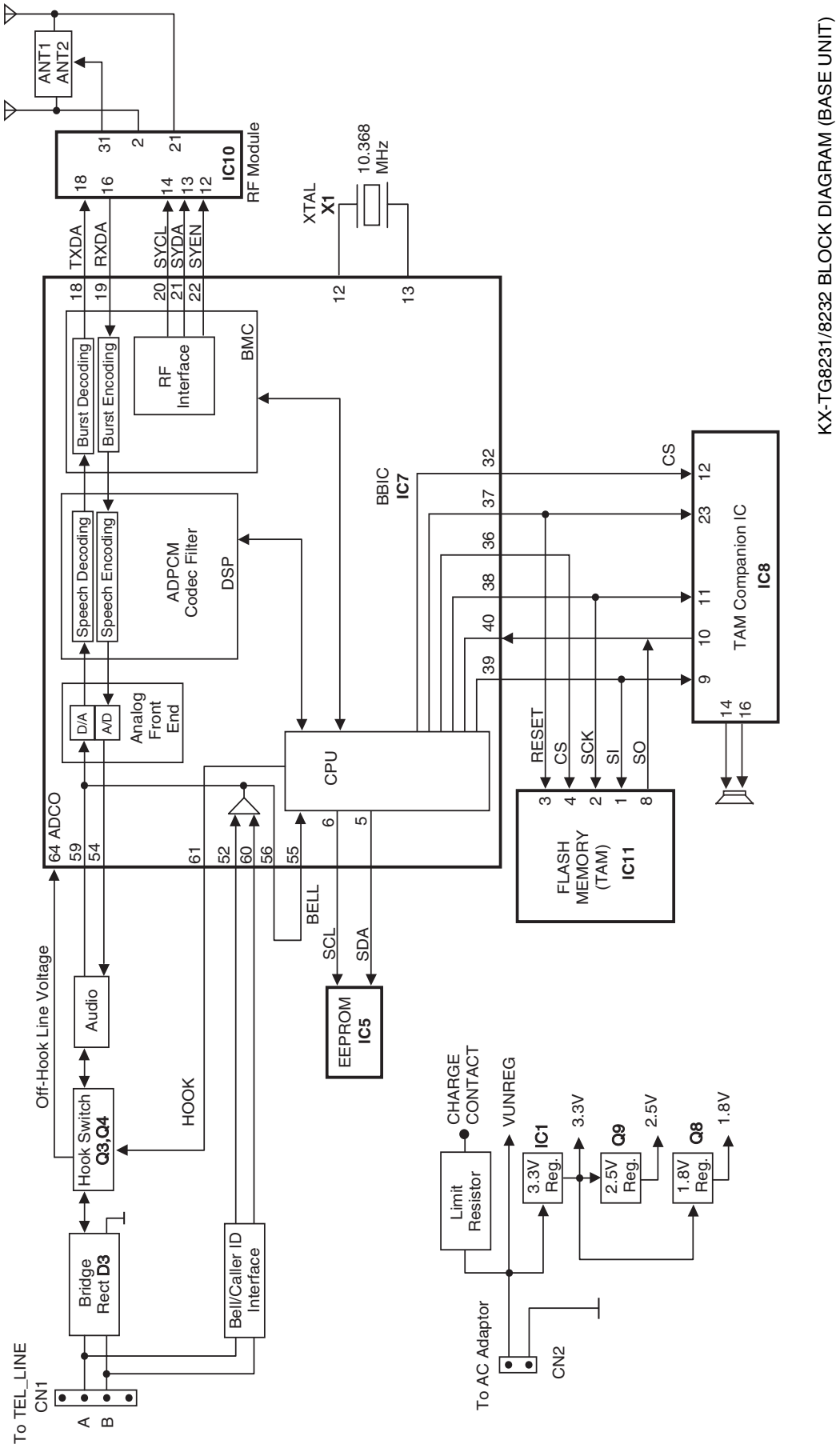
	Base Unit	Handset	Charger
Power source	AC Adaptor (PQLV207V, 120 V AC, 60 Hz)	Rechargeable Ni-MH battery AAA (R03) size (1.2 V 550 mAh)	AC Adaptor (PQLV209V, 120 V AC, 60 Hz)
Ringer Equivalence No. (REN)	0.1B	——	——
Security Codes	——	1,000,000	——
Dialing Mode	——	Tone (DTMF)/Pulse	——
Redial	——	Up to 48 digits	——
Power Consumption	Standby: Approx. 1.8 W Maximum: Approx. 5.0 W	150 hours at Standby, 12 hours at Talk	Standby: Approx. 0.7 W, Maximum: Approx. 3.5 W
Operating Environment	5 ˚C - 40 ˚C (41 ˚F – 104 ˚F) 20 % – 80 % relative air humidity (dry)	5 ˚C - 40 ˚C (41 ˚F – 104 ˚F) 20 % – 80 % relative air humidity (dry)	5 ˚C - 40 ˚C (41 ˚F – 104 ˚F) 20 % – 80 % relative air humidity (dry)
Dimensions (H x W x D)	Approx. 44 mm × 116 mm × 113 mm ($1\ ^{23}/_{32}$" × $4\ ^{9}/_{16}$" × $4\ ^{7}/_{16}$")	Approx. 143 mm × 47 mm × 32 mm ($5\ ^{5}/_{8}$" × $1\ ^{27}/_{32}$" × $1\ ^{1}/_{4}$")	Approx. 46 mm × 77 mm × 87 mm ($1\ ^{13}/_{16}$" × $3\ ^{1}/_{32}$" × $3\ ^{7}/_{16}$")
Mass (Weight)	Approx. 190 g (0.42 lb.)	Approx. 120 g (0.26 lb.)	Approx. 70 g (0.15 lb.)

Note:
- Design and specifications are subject to change without notice.

Note for Service:
- **Optional headset:** KX-TCA60, KX-TCA86, KX-TCA88HA, KX-TCA92, KX-TCA93, KX-TCA94, or KX-TCA95

4 Technical Descriptions

4.1. Block Diagram (Base Unit)



4.2. Circuit Operation (Base Unit)

4.2.1. Outline

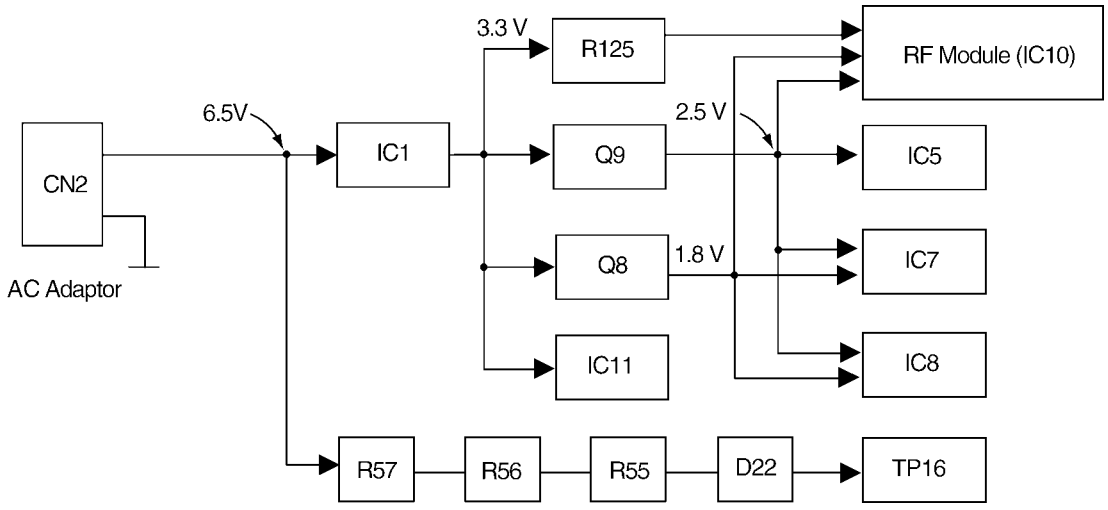
Base unit consists of the following ICs as shown in **Block Diagram (Base Unit)** (P.7).

- DECT BBIC (**B**ase **B**and IC): IC7
  - Handling all the audio, signal and data processing needed in a DECT base unit
  - Controlling the DECT specific physical layer and radio section (**B**urst **M**odule **C**ontroller section)
  - ADPCM code filter for speech encoding and speech decoding (DSP section)
  - Echo-cancellation and Echo-suppression (DSP section)
  - Any tones (tone, sidetone, ringing tone, etc.) generation (DSP section)
  - DTMF receiver (DSP section)
  - Clock Generation for RF Module
  - ADC, DAC, timer, and power control circuitry
  - All interfaces (ex: RF module, EEPROM, LED, Analog Front End, etc.)
- RF Module: IC10
  - PLL Oscillator
  - Detector
  - Compress/Expander
  - First Mixer
  - Amplifier for transmission and reception
- EEPROM: IC5
  - Temporary operating parameters (for RF, etc.)
- FLASH MEMORY: IC11
  - Voice Prompt (TAM) D/L Area
  - ICM/OGM/MEMO Recording Area
- TAM Companion: IC8
  - Voice data compression and decompression
  - Speaker Amp
  - LED Driver
- Additionally,
  - Power Supply Circuit (+3.3 V, +2.5 V, +1.8 V output)
  - Crystal Circuit (10.368 MHz)
  - Charge Circuit
  - Telephone Line Interface Circuit

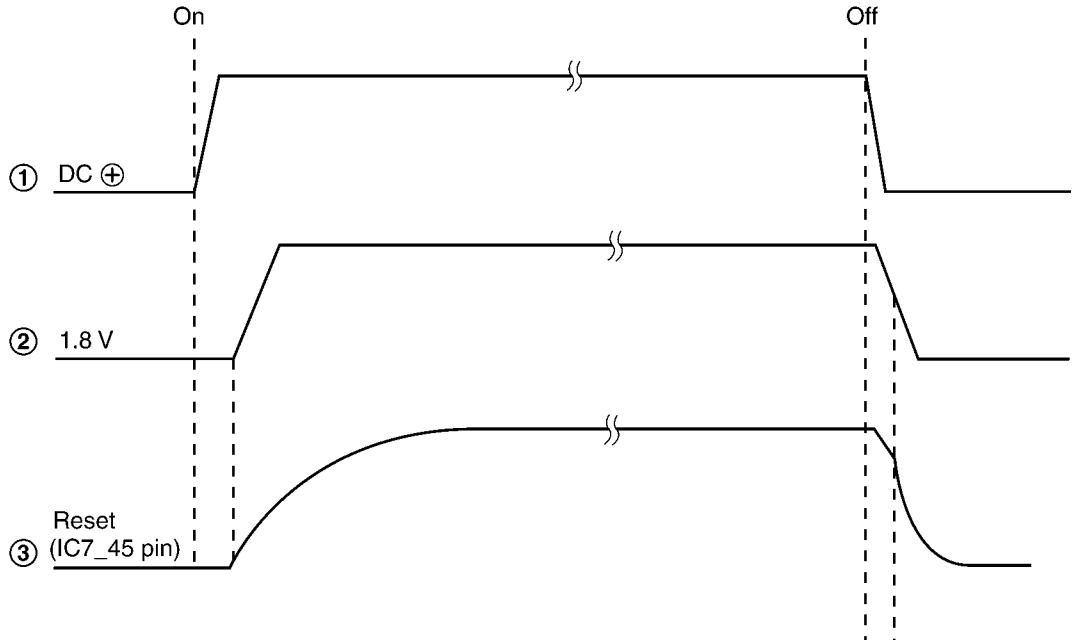
4.2.2. Power Supply Circuit

The power is supplied to the DECT BBIC, RF Module, EEPROM, FLASH MEMORY, TAM Companion and Charge Contact from AC Adaptor (+6.5 V) as shown in Fig.101. The power supply is as follows;

- DECT BBIC (IC7):
  CN2 (+6.5 V) → IC1 → Q9 → IC7
  CN2 (+6.5 V) → IC1 → Q8 → IC7
- RF Module (IC10):
  CN2 (+6.5 V) → IC1 → Q8 → IC10 (Radio Transceiver) (Digital)
  CN2 (+6.5 V) → IC1 → Q9 → IC10 (Radio Transceiver) (Analog)
  CN2 (+6.5 V) → IC1 → R125 → IC10 (Power AMP)
- EEPROM (IC5):
  CN2 (+6.5 V) → IC1 → Q9 → IC5
- FLASH MEMORY (IC11):
  CN2 (+6.5 V) → IC1 → IC11
- TAM Companion (IC8):
  CN2 (+6.5 V) → IC1 → Q9 → IC8
  CN2 (+6.5 V) → IC1 → Q8 → IC8
- Charge Contact (TP16):
  CN2 (+6.5 V) → R57 → R56 → R55 → D22 → TP16



<Fig.101>



4.2.3. Telephone Line Interface

<Function>

- Bell signal detection
- Clip signal detection
- ON/OFF hook circuit

Bell & Clip (: Calling Line Identification Presentation: Caller ID) signal detection:

In the standby mode, Q3 is open to cut the DC loop current and decrease the ring load.

When ring voltage appears at the L1T (A) and L1R (B) leads (when the telephone rings), the AC ring voltage is transferred as follows;

- A → C4 → R6 → R33 → IC7 Pin 60 (CID INp)
- B → C3 → R4 → R35 → IC7 Pin 52 (CID INn)

ON/OFF hook circuit:

In the standby mode, Q3 is open, and connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an **on-hook condition**.

When IC7 detects a ring signal or press the TALK Key onto the handset, Q4 turns on and then Q3 turns on, thus providing an **off-hook condition** (DC current flows through the circuit) and the following signal flow makes the loop current.

- A → D3 → Q3 → Q5 → R21 → R22 → D3 → B [**OFF HOOK**]

4.2.4. Transmitter/Receiver

- Audio Circuits and DTMF tone signal circuits.

Base unit and handset mainly consist of RF Module and DECT BBIC.

Base unit and handset transmit/receive voice signal and data signal through the antenna on carrier frequency.

Signal Path:

*Refer to **Signal Route** (P.14).

4.2.4.1. Transmitter Block

The voice signal input from the TEL LINE interface goes to RF Module (IC10) through DECT BBIC (IC7) as shown in **Block Diagram (Base Unit)** (P.7)

The voice signal passes through the analog part of IC7 where it is amplified and converted to a digital audio stream signal. The burst switch controller processes this stream performing encryption and scrambling, adding the various other fields to produce the standard DECT frame, assigning to a time slot and channel etc.

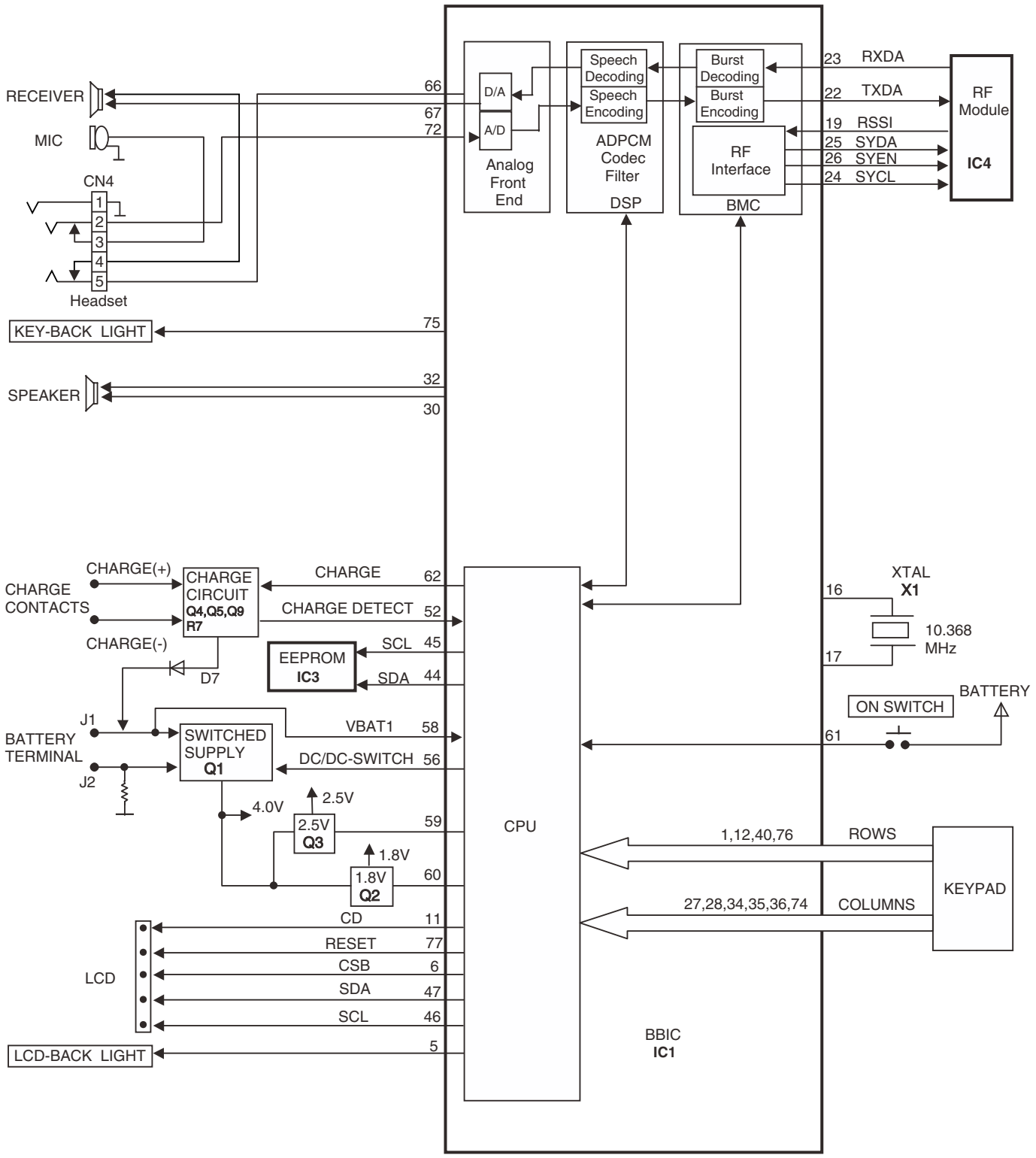
In IC10, the carrier frequency is changing, and frequency modulated RF signal is generated and amplified, and radiated from antenna. Handset detects the voice signal or data signal in the circuit same as the following explanation of Receiver Block.

4.2.4.2. Receiver Block

The signal of 1900 MHz band (1920 MHz ~ 1930 MHz) which is input from antenna is input to IC10 as shown in **Block Diagram (Base Unit)** (P.7).

In IC10, the signal of 1900 MHz band is downconverted to 864 kHz signal and demodulated, and goes to IC7 as standard DECT frames. It passes through the decoding section burst switch controller where it separates out the frame information and performs de-encryption and de-scrambling as required. It then goes to the DSP section where it is turned back into analog audio. This is amplified by the analog front end, and goes to the TEL LINE Interface.

4.3. Block Diagram (Handset)



KX-TGA820 BLOCK DIAGRAM (HANDSET)

4.4. Circuit Operation (Handset)

4.4.1. Outline

Handset consists of the following ICs as shown in **Block Diagram (Handset)** (P.11).

- DECT BBIC (**B**ase **B**and IC): IC1
  - All data signals (forming/analyzing ACK or CMD signal)
  - All interfaces (ex: Key, Detector Circuit, Charge, DC/DC Converter, EEPROM, LCD)
- RF Module: IC4
  - PLL Oscillator
  - Detector
  - Compress/Expander
  - Amplifier for transmission and reception
- EEPROM: IC3
  - Temporary operating parameters (for RF, etc.)

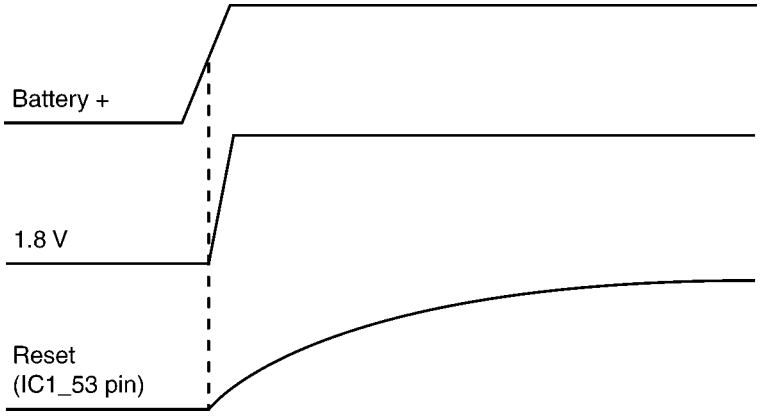
4.4.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

When power on the handset, the voltage is as follows;

BATTERY(2.2 V ~ 2.6 V: J1) → F1, L1, D1 → Q2 (1.8 V), Q3 (2.5 V), Q1 (3.3 V)

The Reset signal generates IC1 (53 pin) and 1.8 V.



4.4.3. Charge Circuit

Circuit Operation:

When charging the handset on the base unit, the charge current is as follows;

DC+(6.5 V) → R57 → R56 → R55→ D22 → CHARGE+(Base) → CHARGE+(Handset) → L4 → Q4 → D7→ F1 → BATTERY+...

Battery... BATTERY- → R45 → GND → L5 → CHARGE-(Handset)→ CHARGE-(Base) → GND → DC-(GND)

In this way, the BBIC on handset detects the fact that the battery is charged.

The charge current is controlled by switching Q5 of handset.

Refer to Fig.101 in **Power Supply Circuit** (P.9).

4.4.4. Battery Low/Power Down Detector

Circuit Operation:

"Battery Low" and "Power Down" are detected by BBIC which check the voltage from battery.

The detected voltage is as follows;

- Battery Low

Battery voltage: V(Batt) ≦ 2.25 V ± 50 mV

The BBIC detects this level and "🔋" starts flashing.

- Power Down

Battery voltage: V(Batt) ≦ 2.0 V ± 50 mV

The BBIC detects this level and power down.

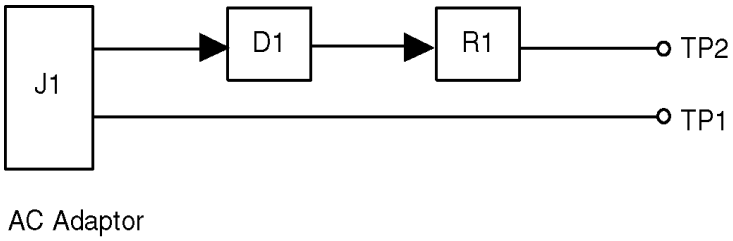
4.4.5. Speakerphone

The hands-free loudspeaker at SP+ and SP- is used to generate the ring alarm.

4.5. Circuit Operation (Charger Unit)

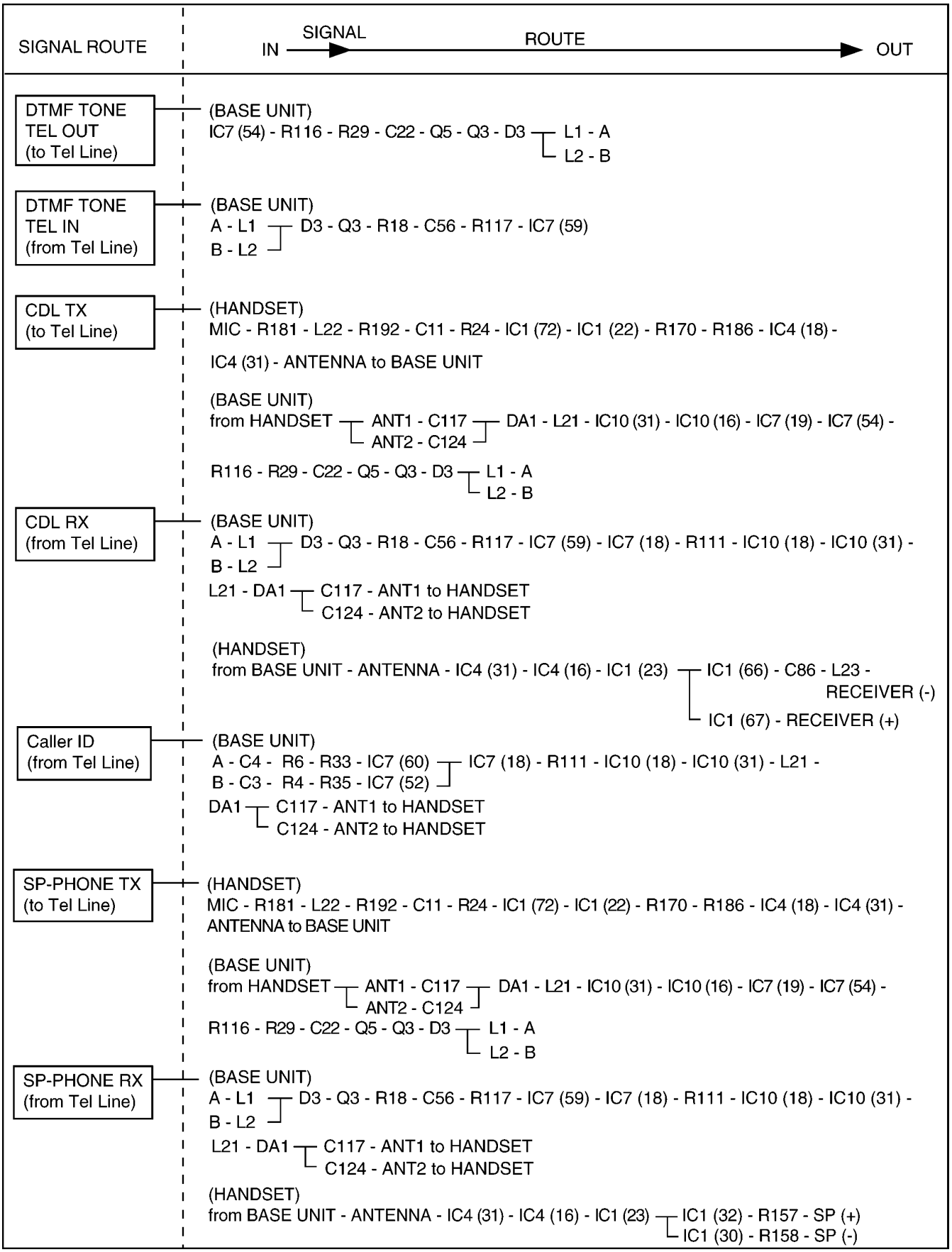
4.5.1. Power Supply Circuit

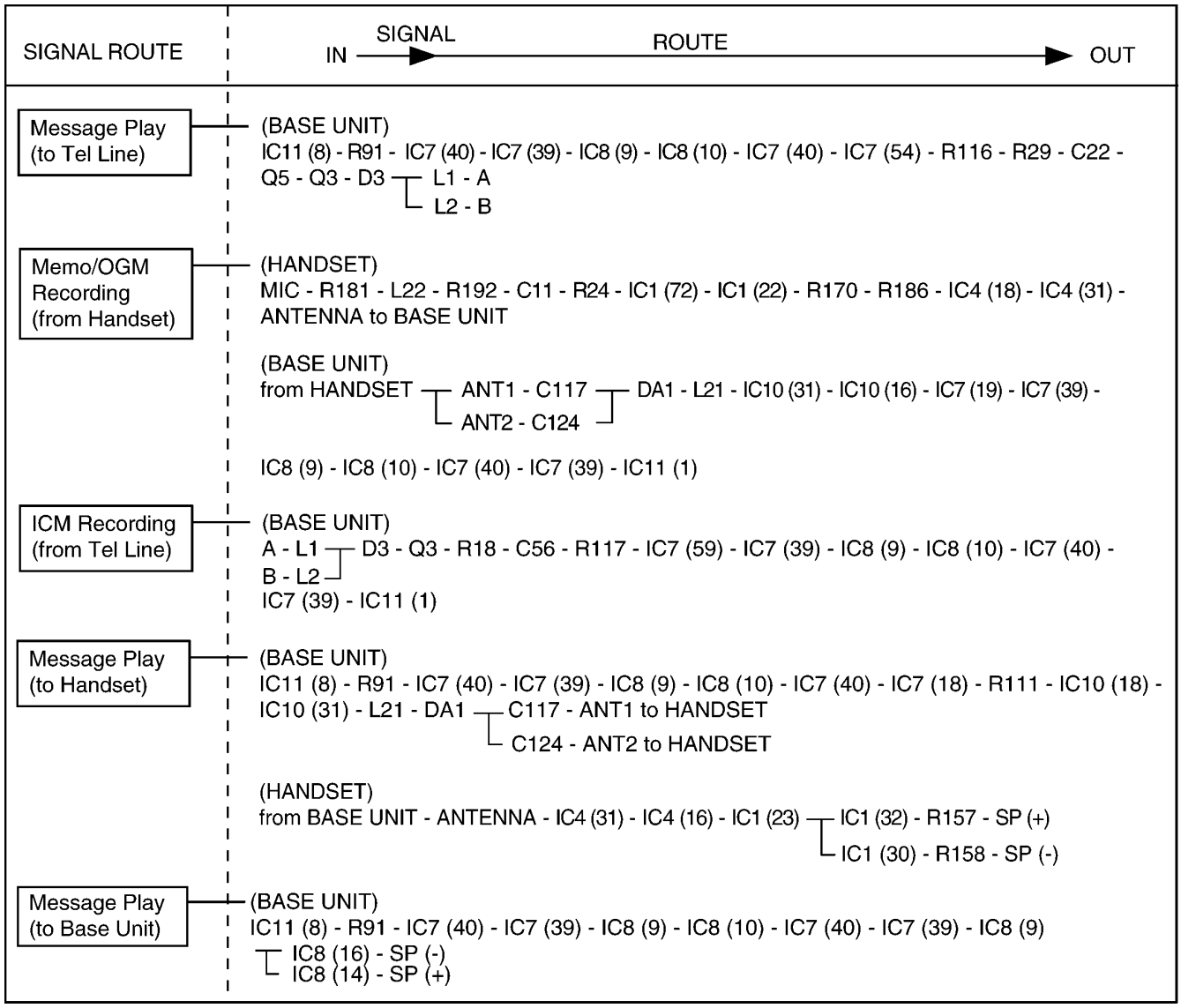
The power supply is as shown.



AC Adaptor

4.6. Signal Route

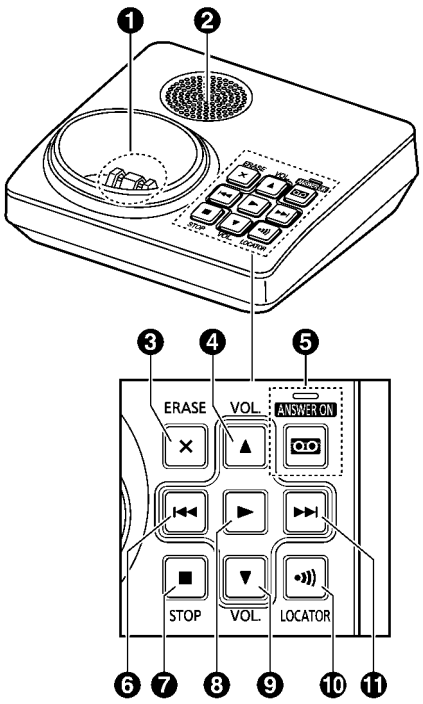

SIGNAL ROUTE
SIGNAL
IN
ROUTE
OUT
DTMF TONE TEL OUT (to Tel Line)
(BASE UNIT)
IC7 (54) - R116 - R29 - C22 - Q5 - Q3 - D3 - L1 - A
L2 - B
DTMF TONE TEL IN (from Tel Line)
(BASE UNIT)
A - L1 - D3 - Q3 - R18 - C56 - R117 - IC7 (59)
B - L2
CDL TX (to Tel Line)
(HANDSET)
MIC - R181 - L22 - R192 - C11 - R24 - IC1 (72) - IC1 (22) - R170 - R186 - IC4 (18) -
IC4 (31) - ANTENNA to BASE UNIT
(BASE UNIT)
from HANDSET - ANT1 - C117 - DA1 - L21 - IC10 (31) - IC10 (16) - IC7 (19) - IC7 (54) -
ANT2 - C124
R116 - R29 - C22 - Q5 - Q3 - D3 - L1 - A
L2 - B
CDL RX (from Tel Line)
(BASE UNIT)
A - L1 - D3 - Q3 - R18 - C56 - R117 - IC7 (59) - IC7 (18) - R111 - IC10 (18) - IC10 (31) -
B - L2
L21 - DA1 - C117 - ANT1 to HANDSET
C124 - ANT2 to HANDSET
(HANDSET)
from BASE UNIT - ANTENNA - IC4 (31) - IC4 (16) - IC1 (23) - IC1 (66) - C86 - L23 - RECEIVER (-)
IC1 (67) - RECEIVER (+)
Caller ID (from Tel Line)
(BASE UNIT)
A - C4 - R6 - R33 - IC7 (60) - IC7 (18) - R111 - IC10 (18) - IC10 (31) - L21 -
B - C3 - R4 - R35 - IC7 (52)
DA1 - C117 - ANT1 to HANDSET
C124 - ANT2 to HANDSET
SP-PHONE TX (to Tel Line)
(HANDSET)
MIC - R181 - L22 - R192 - C11 - R24 - IC1 (72) - IC1 (22) - R170 - R186 - IC4 (18) - IC4 (31) -
ANTENNA to BASE UNIT
(BASE UNIT)
from HANDSET - ANT1 - C117 - DA1 - L21 - IC10 (31) - IC10 (16) - IC7 (19) - IC7 (54) -
ANT2 - C124
R116 - R29 - C22 - Q5 - Q3 - D3 - L1 - A
L2 - B
SP-PHONE RX (from Tel Line)
(BASE UNIT)
A - L1 - D3 - Q3 - R18 - C56 - R117 - IC7 (59) - IC7 (18) - R111 - IC10 (18) - IC10 (31) -
B - L2
L21 - DA1 - C117 - ANT1 to HANDSET
C124 - ANT2 to HANDSET
(HANDSET)
from BASE UNIT - ANTENNA - IC4 (31) - IC4 (16) - IC1 (23) - IC1 (32) - R157 - SP (+)
IC1 (30) - R158 - SP (-)


SIGNAL ROUTE
SIGNAL
IN
ROUTE
OUT
Message Play (to Tel Line)
(BASE UNIT)
IC11 (8) - R91 - IC7 (40) - IC7 (39) - IC8 (9) - IC8 (10) - IC7 (40) - IC7 (54) - R116 - R29 - C22 - Q5 - Q3 - D3 - L1 - A
L2 - B
Memo/OGM Recording (from Handset)
(HANDSET)
MIC - R181 - L22 - R192 - C11 - R24 - IC1 (72) - IC1 (22) - R170 - R186 - IC4 (18) - IC4 (31) - ANTENNA to BASE UNIT
(BASE UNIT)
from HANDSET - ANT1 - C117 - DA1 - L21 - IC10 (31) - IC10 (16) - IC7 (19) - IC7 (39) -
ANT2 - C124
IC8 (9) - IC8 (10) - IC7 (40) - IC7 (39) - IC11 (1)
ICM Recording (from Tel Line)
(BASE UNIT)
A - L1 - D3 - Q3 - R18 - C56 - R117 - IC7 (59) - IC7 (39) - IC8 (9) - IC8 (10) - IC7 (40) -
B - L2
IC7 (39) - IC11 (1)
Message Play (to Handset)
(BASE UNIT)
IC11 (8) - R91 - IC7 (40) - IC7 (39) - IC8 (9) - IC8 (10) - IC7 (40) - IC7 (18) - R111 - IC10 (18) - IC10 (31) - L21 - DA1 - C117 - ANT1 to HANDSET
C124 - ANT2 to HANDSET
(HANDSET)
from BASE UNIT - ANTENNA - IC4 (31) - IC4 (16) - IC1 (23) - IC1 (32) - R157 - SP (+)
IC1 (30) - R158 - SP (-)
Message Play (to Base Unit)
(BASE UNIT)
IC11 (8) - R91 - IC7 (40) - IC7 (39) - IC8 (9) - IC8 (10) - IC7 (40) - IC7 (39) - IC8 (9)
IC8 (16) - SP (-)
IC8 (14) - SP (+)

5 Location of Controls and Components

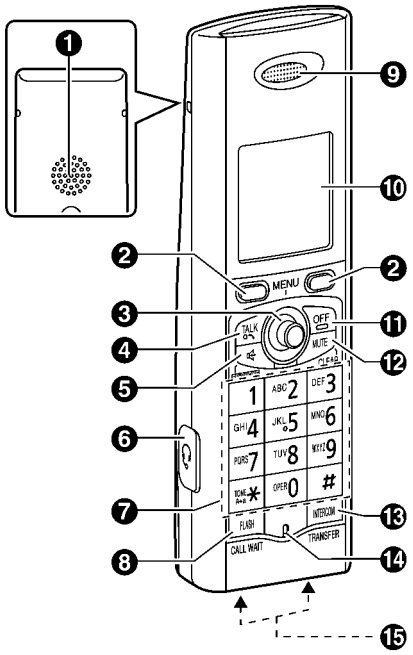
5.1. Controls

5.1.1. Base Unit



❶ Charge contacts
❷ Speaker
❸ [×] (ERASE)
❹ [▲] (VOL.: Volume up)
❺ [📼] (ANSWER ON)
ANSWER ON indicator
❻ [⏮] (Repeat)
❼ [■] (STOP)
❽ [▶] (Message)
Message indicator
❾ [▼] (VOL.: Volume down)
❿ [📢] (LOCATOR)
⓫ [⏭] (Skip)

5.1.2. Handset



❶ Speaker
❷ Soft keys
❸ Joystick
❹ [📞] (TALK)
❺ [🔊] (SP-PHONE: Speakerphone)
❻ Headset jack
❼ Dial keypad
([✳]: TONE)
❽ [FLASH] [CALL WAIT]
❾ Receiver
❿ Display
⓫ [OFF]
⓬ [MUTE] [CLEAR]
⓭ [INTERCOM] [TRANSFER]
⓮ Microphone
⓯ Charge contacts

5.2. Displays

Handset display items

Item	Meaning
📶	Within range of a base unit ● When flashing: Handset is searching for base unit.
🕒	Alarm is on.
📞	Handset is on an outside call.
SP	Speaker is on.
🔕	Ringer volume is off.
PRIV.	Call privacy mode is on.
1	Handset number
In use	● Line is being used by another handset for calling, registration, etc. ● Answering system is being used by another handset or the base unit.
🔋	Battery level

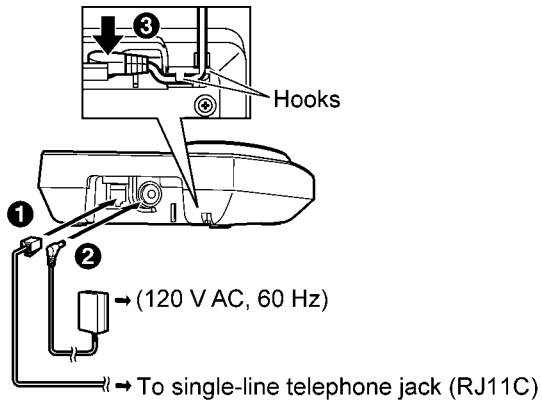
6 Installation Instructions

6.1. Connections

Connect the telephone line cord until it clicks into the base unit and telephone line jack (❶). Connect the AC adaptor cord (❷) by pressing the plug firmly (❸).

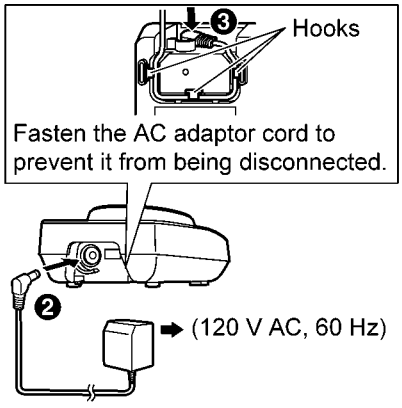
Base unit

- Use only the supplied Panasonic AC adaptor PQLV207V.
- Use only the supplied telephone line cord.



Charger

- Use only the supplied Panasonic AC adaptor PQLV209V.



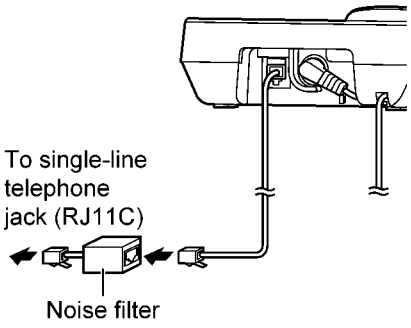
Note:

- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)
- The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.
- The unit will not work during a power failure. We recommend connecting a corded telephone to the same telephone line or to the same telephone line jack using a Panasonic T-adaptor.

If you subscribe to a DSL service

Please attach a noise filter (contact your DSL provider) to the telephone line between the base unit and the telephone line jack in the event of the following:

– Noise is heard during conversations.
– Caller ID features do not function properly.



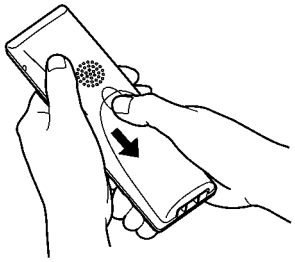
6.2. Battery

6.2.1. Battery Installation and Replacement

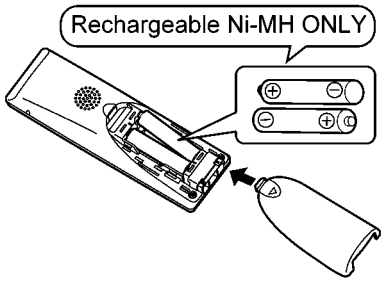
Important:

- Use only the supplied rechargeable batteries HHR-4DPA.
- USE ONLY rechargeable Ni-MH batteries AAA (R03) size.
- Do NOT use Alkaline/Manganese/Ni-Cd batteries.
- Ensure correct polarities (⊕, ⊖) when installing the batteries.
- Wipe the battery ends (⊕, ⊖) with a dry cloth.
- When installing the batteries, avoid touching the battery ends (⊕, ⊖) or the unit contacts.
- When replacing batteries, we recommend using the Panasonic rechargeable batteries HHR-4DPA.

1 Press the notch on the handset cover firmly and slide it in the direction of the arrow.

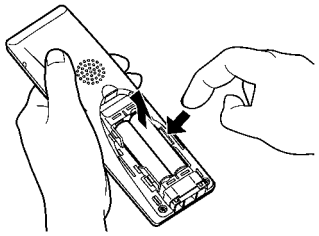


2 Insert the batteries negative (⊖) end first. Close the handset cover.



Note:

- When replacing batteries, remove the old batteries.



Attention:

A nickel metal hydride battery that is recyclable powers the product you have purchased.

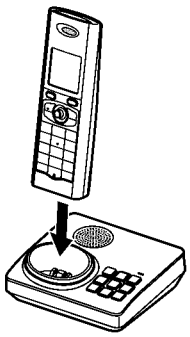
Please call 1-800-8-BATTERY (1-800-822-8837) for information on how to recycle this battery.

6.2.2. Battery Charge

Place the handset on the base unit or charger for 7 hours before initial use.

- While charging, "`Charging`" is displayed. When the batteries are fully charged, "`Charge completed`" is displayed.

Base unit: **Charger:**



Note:

- It is normal for the handset to feel warm during charging.
- If you want to use the handset immediately, charge the batteries for at least 15 minutes.
- Clean the charge contacts of the handset, base unit, and charger with a soft, dry cloth. Clean if the unit is subject to the exposure of grease, dust, or high humidity.
- When the batteries are empty, the entire display may go blank and "`Charging`" may not be displayed for about 10 minutes even if you place the handset on the base unit or charger.

Note for service:

The battery strength may not be indicated correctly if the battery is disconnected and connected again, even after it is fully charged. In that case, by recharging the battery as mentioned above, you will get a correct indication of the battery strength.

6.2.3. Battery Level

Battery icon	Battery level
	High
	Medium
	Low ● When flashing: Needs to be charged.

Note:

- When the batteries need to be charged, the handset beeps intermittently during use.

6.2.4. Panasonic Ni-MH Battery Performance (supplied batteries)

Operation	Operating time
In continuous use	12 hours max.
In continuous standby mode	150 hours max.

Note:

- Battery operating time may be shortened over time depending on usage conditions and surrounding temperature.
- Battery power is consumed whenever the handset is off the base unit or charger, even when the handset is not in use.
- After the handset is fully charged, displaying "`Charge completed`", it may be left on the base unit or charger without any ill effect on the batteries.
- The battery level may not be displayed correctly or the entire display may go blank after you replace the batteries. In this case, place the handset on the base unit or charger and let it charge for 7 hours.

7 Operation Instructions

7.1. Programmable Settings

You can customize the unit by programming the following features using the handset.

Programming by scrolling through the display menus

1 **【MENU】** (center of joystick)
2 Select "Menu icon" by pushing the joystick in any direction. → **【SELECT】**
3 Push the joystick up or down to select the desired item in the sub-menu. → **【SELECT】**
- In some cases, you may need to select from a second sub-menu. → **【SELECT】**

4 Push the joystick up or down to select the desired setting then press **【SAVE】**.
- This step may vary depending on the feature being programmed.
- To exit the operation, press **【OFF】**.

Note:
- In the following table, < > indicates the default setting.
- The current item or setting is highlighted on the display.

Main menu	Sub-menu 1	Sub-menu 2
View Caller ID	–	–
Display settings	Wallpaper <Wallpaper1 >	–
	Display color <Color1>	–
	Change language <English>	–
	Contrast <Contrast 3>	–
Set date & time	Date and time*1	–
	Alarm <Off>	–
	Time adjustment*1, *2 <Caller ID[auto]>	–
Answering device	Play new msg.	–
	Play all msg.	–
	Record greeting*1	–

Main menu	Sub-menu 1	Sub-menu 2
Answering device	Answer on*1 Answer off*1 <Answer on>	–
	Play greeting	–
	Erase message	Erase all*1
		Erase greeting*1
	Settings	Remote code*1 <111>
		Ring count*1 <4 rings>
		Recording time*1 <3 min>
		Call screening*1 <On>
		Voice prompt*1 <English>
Initial settings	Ringer settings	Ringer volume <Level 6>*3
		Ringer tone*4, *5, *6 <Tone 1>
	Display settings	Wallpaper <Wallpaper1 >
		Display color <Color1>
		Change language <English>
		Contrast <Contrast 3>
	Registration	HS registration (Handset registration)
		Deregistration
	Set tel line	Set dial mode*1 <Tone>
		Set flash time <700 ms>*1, *7

Main menu	Sub-menu 1	Sub-menu 2
Initial settings	Other settings	Key tone*8 <On>
		Auto talk*9 <Off>
		Caller ID edit <On>
Customer support	–	–

*1 If you program these settings using one of the handsets, you do not need to program the same item using another handset.
*2 This feature allows the unit to automatically adjust the date and time setting when caller information is received. To use this feature, set the date and time first.
*3 When the ringer volume is turned off, is displayed and the handset does not ring for outside calls.
However even when the ringer volume is turned off, the handset rings:
– at the minimum level for alarm and intercom calls
– at the maximum level for paging
*4 If you subscribe to a distinctive ring service (such as IDENTA-RING), select a tone (tone 1 to 5). If you select a melody, you cannot distinguish lines by their ringers.
*5 The preset melodies in this product are used with permission of © 2006 Copyrights Vision Inc.
*6 If you select one of the melody ringer tones, the ringer tone will continue to sound for several seconds if the caller hangs up before you answer. You may hear a dial tone or no one on the line when you answer a call.
*7 The flash time depends on your telephone exchange or host PBX. Consult your PBX supplier if necessary. The setting should stay at "700 ms" unless pressing **[FLASH]** fails to pick up the call waiting call.
*8 Turn this feature off if you prefer not to hear key tones while you are dialing or pressing any keys, including confirmation tones and error tones.
*9 If you subscribe to Caller ID service and want to view the caller's information after lifting up the handset to answer a call, turn off this feature.

7.2. Registering a Handset to a Base Unit

The supplied handset and base unit are pre-registered. If for some reason the handset is not registered to the base unit (for example, Ⓨ flashes even when the handset is near the base unit), register the handset.

1 **[MENU]** (center of joystick) → 🔧 → **[SELECT]**
2 **[▼]**/**[▲]**: "Registration" → **[SELECT]**
3 **[▼]**/**[▲]**: "HS registration" → **[SELECT]**
4 **Base unit:**
Press and hold **[•))]** (LOCATOR) for about 5 seconds, until the registration tone sounds.
- If all registered handsets start ringing, press **[•))]** (LOCATOR) to stop, then repeat this step.
- After pressing **[•))]** (LOCATOR), the rest of this procedure must be completed within 1 minute and 30 seconds.

5 **Handset:**
Press **[OK]**, then wait until a long beep sounds and Ⓨ stops flashing.
- When the handset has been registered successfully, Ⓨ will stop flashing. If the key tone is turned on, a confirmation tone will be heard.

7.2.1. Deregistering a Handset

A handset can cancel its own registration (or the registration of another handset) that is stored in the base unit. This will allow the handset to end its wireless connection with the system.

1 **[MENU]** (center of joystick) → 🔧 → **[SELECT]**
2 **[▼]**/**[▲]**: "Registration" → **[SELECT]**
3 **[▼]**/**[▲]**: "Deregistration" → **[SELECT]**
4 **[3][3][5]** → **[OK]**
- The numbers of all handsets registered to the base unit are displayed.

5 Select the handset(s) you want to cancel, by pressing the desired handset number (**[1]** – **[6]**). → **[OK]**
- The selected handset number(s) flashes.
- To cancel a selected handset number, press the number again. The number stops flashing.

6 **[▼]**/**[▲]**: "Yes" → **[SELECT]**
- A long beep will sound as each handset number disappears.

7 After "Deregistered" is displayed, press **[OFF]**.

7.3. Copying Handset Phonebook Entries

You can copy handset phonebook entries to the handset phonebook of another compatible Panasonic handset.

Note:
- Group settings for phonebook entries are not copied.

Copying all entries

1 **[📖]** (left soft key) → **[MENU]**
2 **[▼]**/**[▲]**: "Copy all" → **[SELECT]**
3 Select the handset to copy to by pressing the desired handset number (**[1]** – **[6]**).
- When all entries have been copied, "Completed" is displayed.

4 **[OFF]**

7.4. Error Messages

If the unit detects a problem, one of the following messages is shown on the display.

Display message	Cause/solution
Busy	● The called handset is in use. ● The handset you are calling is too far from the base unit. ● There is no handset registered to the base unit matching the extension number you entered. ● Other units are in use and the system is busy. Try again later.
Error!!	● Recording was too short. Try again.
Failed	● Phonebook copy failed. Confirm the other handset (the receiver) is in standby mode and try again.
Incomplete	● The receiver's phonebook memory is full. Erase the unnecessary phonebook entries from the other handset (the receiver) and try again.
Memory full	● The handset's phonebook memory is full. Erase unnecessary entries.
Messages full	● Message memory becomes full. Erase unnecessary messages.
No items stored	● Your phonebook, caller list or redial list is empty.
No link to base. Move closer to base, try again.	● The handset has lost communication with the base unit. Move closer to the base unit and try again. ● Unplug the base unit's AC adaptor to reset the unit. Reconnect the adaptor and try again. ● The handset's registration may have been canceled. Re-register the handset.
Please lift up and try again.	● A handset button was pressed while the handset was on the base unit or charger. Lift the handset and press the button again.
You must first subscribe to Caller ID.	● You must subscribe to Caller ID service. Once you receive caller information after subscribing to Caller ID service, this message will not be displayed.

7.5. Troubleshooting

If you still have difficulties after following the instructions in this section, disconnect the base unit AC adaptor and turn off the handset, then reconnect the base unit AC adaptor and turn on the handset.

General use

Problem	Cause/solution
The unit does not work.	● Make sure the batteries are installed correctly and fully charged. ● Check the connections. ● Unplug the base unit's AC adaptor to reset the unit. Reconnect the adaptor and try again. ● The handset has not been registered to the base unit. Register the handset.
I cannot hear a dial tone.	● The base unit AC adaptor or telephone line cord is not connected. Check the connections. ● If you are using a splitter to connect the unit, remove the splitter and connect the unit to the wall socket directly. If the unit operates properly, check the splitter. ● Disconnect the unit from the telephone line and connect a known working telephone. If the working telephone operates properly, contact our service personnel to have the unit repaired. If the working telephone does not operate properly, contact your service provider/ telephone company.
I do not know how to erase "**missed call**" from the display.	● There are unviewed missed calls remaining. View them using the following method. **1** **[MENU]** (center of joystick) → ➡) → **[SELECT]** **2** Push the joystick down to search from the most recent call, or push the joystick up to search from the oldest call.

Programmable settings

Problem	Cause/solution
I have changed the display language to a language I cannot read.	● Change the display language.
I cannot program items.	● Programming is not possible while either the base unit or another handset is being used. Try again later.
While programming, the handset starts to ring.	● A call is being received. Answer the call and start again after hanging up.
I cannot register a handset to a base unit.	● The maximum number of handsets (6) is already registered to the base unit. Cancel unused handset registrations from the base unit. ● Place the handset and the base unit away from other electrical appliances.

Battery recharge

Problem	Cause/solution
The batteries should be charging but the battery icon does not change.	● Clean the charge contacts and charge again.
The handset beeps intermittently and/or 🔋 flashes.	● Fully charge the batteries.
I fully charged the batteries, but 🔋 still flashes.	● Clean the charge contacts and charge again. ● It is time to replace the batteries.
I fully charged the batteries, but the operating time seems to be short.	● Wipe the battery ends (⊕, ⊖) and the unit contacts with a dry cloth.
The handset display is blank.	● The handset is in screen saver mode. Press **【OFF】** to activate the handset display again. ● Confirm that the batteries are properly installed. ● Fully charge the batteries.

Making/answering calls, intercom

Problem	Cause/solution
Y is flashing.	● The handset is not registered to the base unit. Register it. ● The handset is too far from the base unit. Move closer. ● The base unit AC adaptor is not connected. Check the connections. ● You are using the handset or base unit in an area with high electrical interference. Place the handset and base unit away from interference sources, such as antennas and mobile phones.
Y is displayed, but I cannot make a call.	● The handset and base unit could not communicate for some reason, such as interference from other electrical appliances. Perform the following: – Move the handset and base unit away from other electrical appliances. – Move closer to the base unit.
Static is heard, sound cuts in and out. Interference from other electrical units.	● Place the handset and the base unit away from other electrical appliances. ● Move closer to the base unit. ● If your unit is connected to a telephone line with DSL service, we recommend connecting a noise filter between the base unit and the telephone line jack. Contact your DSL provider for details.
Noise is heard during a call.	● You are using the handset or base unit in an area with high electrical interference. Place the handset and base unit away from interference sources, such as antennas and mobile phones.
The handset does not ring.	● The ringer volume is turned off. Adjust the ringer volume.
I cannot make a call.	● The dialing mode may be set incorrectly. Change the setting. ● Another handset is in use or the answering system is being used. Wait and try again later.
I cannot have a conversation using the headset.	● Make sure that an optional headset is connected properly.
I cannot make long distance calls.	● Make sure that you have long distance service.
I cannot page the handset.	● The called handset is too far from the base unit. ● The called handset is in use. Try again later.

Caller ID

Problem	Cause/solution
The handset does not display the caller's name and/or phone number.	• You have not subscribed to Caller ID service. Contact your service provider/telephone company to subscribe. • If your unit is connected to any additional telephone equipment such as a Caller ID box or cordless telephone line jack, disconnect the unit from the equipment and plug the unit directly into the wall jack. • If your unit is connected to a telephone line with DSL service, we recommend connecting a noise filter between the base unit and the telephone line jack. Contact your DSL provider for details. • The name display service may not be available in some areas. Contact your service provider/ telephone company for details. • Other telephone equipment may be interfering with this unit. Disconnect the other equipment and try again. • The caller requested not to send caller information. • If a call is being transferred to you, the caller information is not displayed. • Generally, caller information is displayed from the 2nd ring.
The caller list/incoming phone numbers are not edited automatically.	• The Caller ID number auto edit feature is turned off. Turn it on and try again. • You need to call back the edited number to activate Caller ID number auto edit.
I cannot dial the phone number edited in the caller list.	• The phone number you dialed might have been edited incorrectly (for example, the long distance "1" or the area code is missing). Edit the phone number with another pattern.
Time on the unit is shifted.	• Incorrect time information from incoming Caller ID changes the time. Set "**Time adjustment**" off.
The 2nd caller's information is not displayed during an outside call.	• In order to use Caller ID, Call Waiting, or Call Waiting Caller ID (CWID), you must first contact your service provider/telephone company and subscribe to the desired service. After subscribing, you may need to contact your service provider/telephone company again to activate this specific service, even if you already subscribed to both Caller ID and Call Waiting with Caller ID services (CWID).

Answering system

Problem	Cause/solution
The unit does not record new messages.	● The answering system is off. Turn it on. ● The message memory is full. Erase unnecessary messages. ● If you subscribe to the voice mail service, messages are recorded by your service provider/telephone company not your telephone. Change the unit's "**Ring count**" setting or consult your service provider/ telephone company.
I cannot operate the answering system with the handset.	● The base unit or another handset is being used. Wait for the other user to finish. ● A caller is leaving a message. Wait for the caller to finish. ● The handset is too far from the base unit. Move closer.
When I try to operate the answering system with the base unit, the ANSWER ON indicator on the base unit flashes for a few seconds and I cannot operate the answering system.	● Another handset is being used. Wait for the other user to finish. ● A caller is leaving a message. Wait for the caller to finish.
I cannot operate the answering system remotely.	● You are entering the wrong remote access code. If you forget the remote access code, store a new remote access code again. ● Press each key firmly. ● The answering system is turned off. Turn it on. ● You are using a rotary/pulse telephone. Try again using a touch-tone phone.

Voice Mail

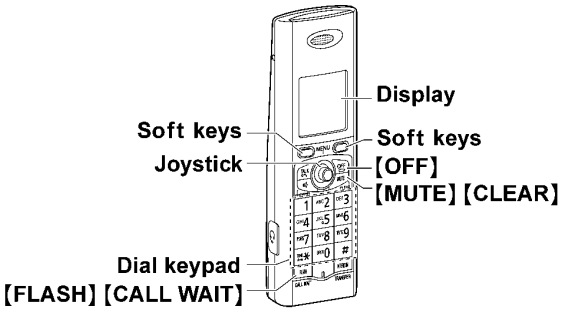
Problem	Cause/solution
"**New Voice Mail**" is not displayed on the handset even though I have new messages in my voice mail service.	● Your service provider/telephone company needs to provide the signal for visual message waiting indicator. Consult your service provider/ telephone company of your Voice Mail service. ● If you hear the "interrupted" dial tone, new messages are waiting. You can check if you have new messages by simply listening to the dial tone even if you cannot be provided the visual message waiting signal. ● To use the Voice Mail service provided by your service provider/telephone company rather than the unit's answering system, turn off the answering system.

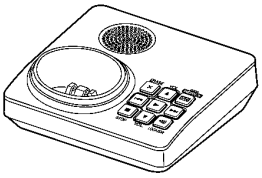
8 Service Mode

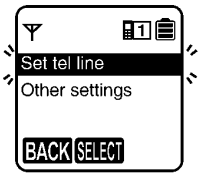
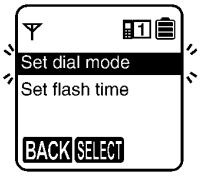
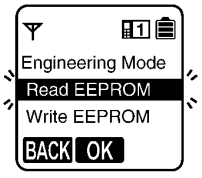
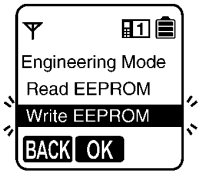
8.1. Engineering Mode

8.1.1. Base Unit

Important:
Make sure the address on LCD is correct when entering new data. Otherwise, you may ruin the unit.

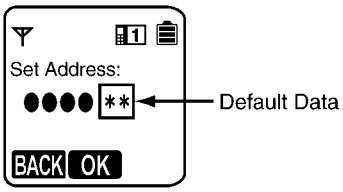




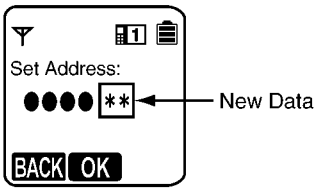
H/S key operation	H/S LCD
1). Register a Handset to a Base Unit. (*1)	
2). Press **【MENU】** (center of joystick), then select " " by pushing the joystick.	
3). Press **【SELECT】** (center of joystick).	
4). Select "Set tel line" by pushing the joystick.	
5). Press **【SELECT】** (center of joystick).	
6). Enter "7", "2", "6", "2", "7", "6", "6", "4". **Note:** 7262 7664 = PANA SONI (see letters printed on dial keys)	
7). Select "Write EEPROM" by pushing the joystick.	

8). Press 【OK】 (center of joystick).

9). Enter "●", "●", "●", "●" (Address). (*2)



10). Enter "∗", "∗" (New Data). (*2)



11). Press 【OK】 (center of joystick).
A long confirmation beep will be heard.

12). Press 【OFF】 to return to standby mode.
After that, turn the base unit power off and then power on.

Frequently Used Items (Base Unit)

ex.)

Items	Address	Default Data	New Data		Remarks
Frequency	00 01	75	-	-	Use these items in a **READ-ONLY** mode to confirm the contents. Careless rewriting may cause serious damage to the computer system.
ID	00 10~00 14	Given value	-	-	

Note:

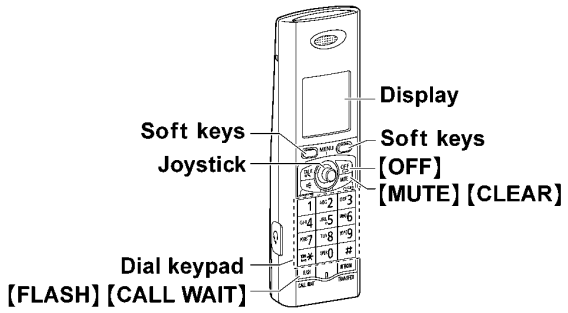
(*1) Refer to **Registering a Handset to a Base Unit** (P.23)

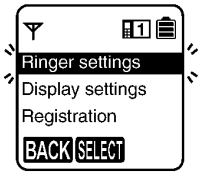
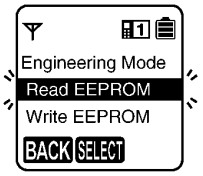
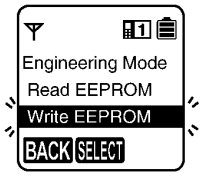
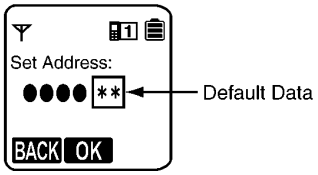
(*2) When you enter the address or New Data, please refer to the table below.

Desired Number (hex)	Input Keys	Desired Number (hex)	Input Keys
0	0	A	[Flash] + 0
1	1	B	[Flash] + 1
.	.	C	[Flash] + 2
.	.	D	[Flash] + 3
.	.	E	[Flash] + 4
9	9	F	[Flash] + 5

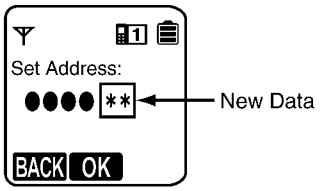
8.1.2. Handset

Important:
Make sure the address on LCD is correct when entering new data. Otherwise, you may ruin the unit.



H/S key operation	H/S LCD
1). Press 【**MENU**】 (center of joystick), then select " " by pushing the joystick.	
2). Press 【**SELECT**】 (center of joystick).	
3). Enter "7", "2", "6", "2", "7", "6", "6", "4". **Note:** 7262 7664 = PANA SONI (see letters printed on dial keys)	
4). Select "Write EEPROM" by pushig the joystick.	
5). Press 【**SELECT**】 (center of joystick).	
6). Enter "●", "●", "●", "●" (Address). (*1)	

7). Enter "＊", "＊" (New Data). (*1)



8). Press 【**OK**】 (center of joystick).
A long confirmation beep will be heard.

9). Press 【**OFF**】 to return to standby mode.
After that, remove and reinsert the batteries.
Press the Power button for about 1 second
if the power is not turned on.

Frequently Used Items (Handset)

ex.)

Items	Address	Default Data	New Data	Possible Adjusted Value MAX (hex)	Possible Adjusted Value MIN (hex)	Remarks
Battery Low	00 04	25	-	-	-	(*2)
Frequency	00 01	75	-	-	-	
ID	00 10~00 14	Given value	-	-	-	

Note:

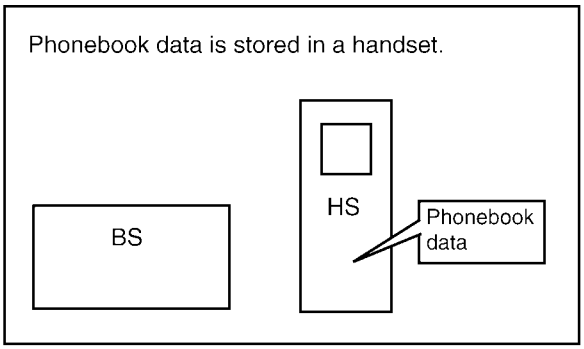
(*1) When you enter the address or New Data, please refer to the table below.

Desired Number (hex.)	Input Keys	Desired Number (hex.)	Input Keys
0	0	A	[Flash] + 0
1	1	B	[Flash] + 1
.	.	C	[Flash] + 2
.	.	D	[Flash] + 3
.	.	E	[Flash] + 4
9	9	F	[Flash] + 5

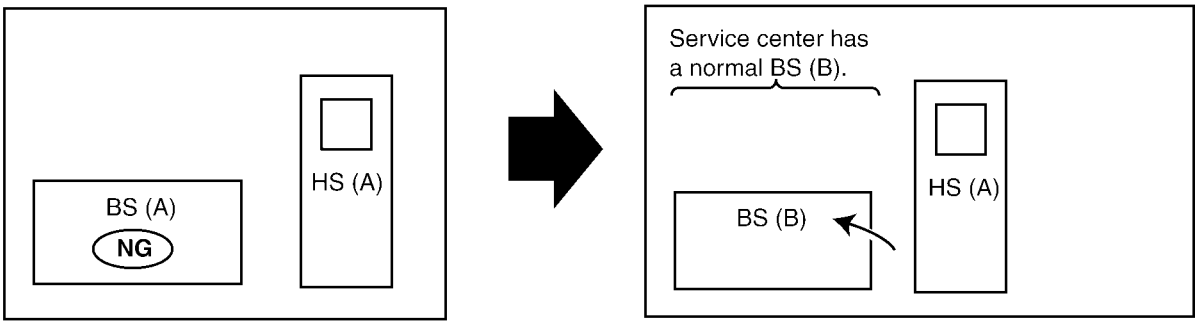
(*2) Use these items in a READ-ONLY mode to confirm the contents. Careless rewriting may cause serious damage to the handset.

8.2. Copying Phonebook Items when Repairing

You can copy the handset phonebook to another (compatible Panasonic) handset. This will help to save the original phonebook data which the customer has registered. Refer to the following procedures.

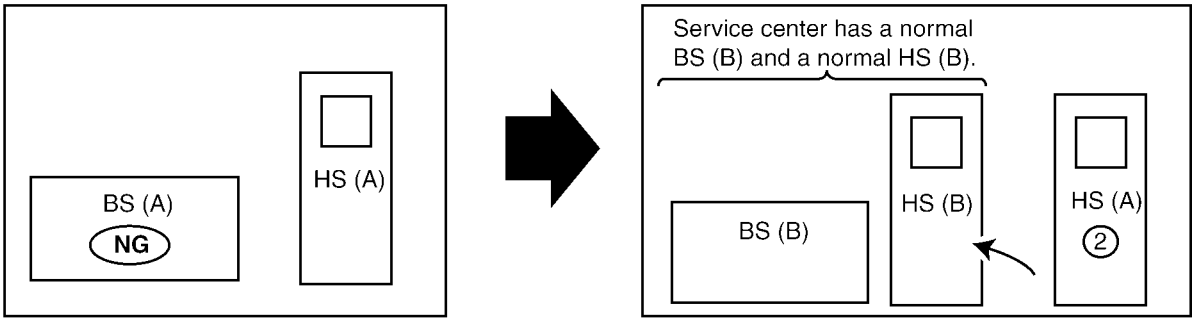


Case 1: A base unit has a defect.
(Replacing a base unit PCB etc...)



1. Register HS (A) to BS (B).
   HS (A) is normal, therefore no need to copy the phonebook data.

Case 2: A base unit has a defect.
(Replacing both a base unit and a handset)

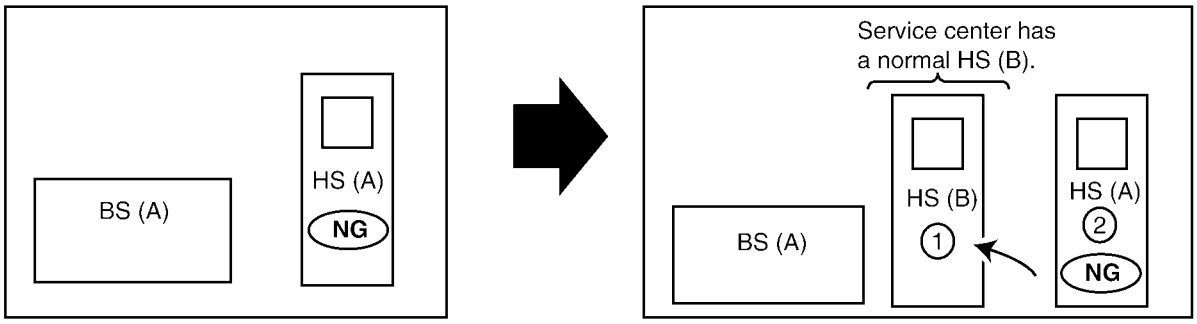


1. Register HS (A) to BS (B) as a handset no. 2.
2. Copy the phonebook data from HS (A) to HS (B).
3. Cancel the HS 2 (HS (A)).

Note:

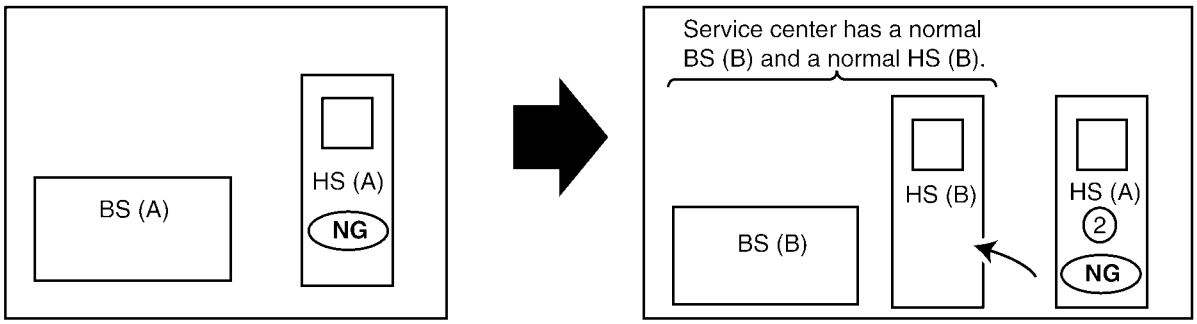
- BS=Base unit, HS=Handset
- If the max number of handsets are already registered to the base unit, a new handset cannot be registered.
- To register the handset, refer to **Registering a Handset to a Base Unit** (P.23).
- To cancel the handset, refer to **Deregistering a Handset** (P.23).
- To copy the handset phonebook, refer to **Copying Handset Phonebook Entries** (P.23).

Case 3: A handset has a defect.
(Radio transmission is functioning.)



1. Cancel HS (A).
2. Register HS (B) as a handset no. 1.
3. Register HS (A) as a handset no. 2.
4. Copy the phonebook data from HS (A) to HS (B).
5. Cancel HS 2 (HS (A)).

Case 4: A handset has a defect.
(Radio transmission is functioning.)



1. Register HS (A) as a handset no. 2.
2. Copy the phonebook data from HS (A) to HS (B).
3. Cancel HS 2 (HS (A)).

Note:

- BS=Base unit, HS=Handset
- If the max number of handsets are already registered to the base unit, a new handset cannot be registered.
- To register the handset, refer to **Registering a Handset to a Base Unit** (P.23).
- To cancel the handset, refer to **Deregistering a Handset** (P.23).
- To copy the handset phonebook, refer to **Copying Handset Phonebook Entries** (P.23).

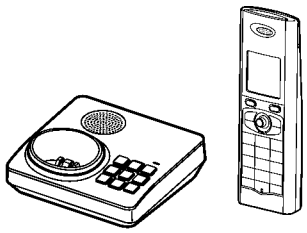
8.3. How to Clear User Setting

Units are reset to the Factory settings by this operation (Erase recorded Voice messages, stored Phone numbers, Caller list and etc.)

Note:

- The reset menus differ depending on the following operations.
- **This operation should not be performed for a usual repair.**

8.3.1. Resetting both base unit and handset



① Connect the AC adaptor to the base unit and install the charged batteries into the handset.

② Confirm the handset is registered to the base unit (lights).
If the handset is not registered to the base unit (is flashing), register it. (*1)

③ Lift the handset and press **【OFF】** to put the handset in standby mode.

④ Press [1], [5], [9] and [*] keys of the handset simultaneously until a confirmation tone is heard.

⑤ Press [2], [5], [8], [0].

⑥ Disconnect the AC adaptor, then remove the battery.

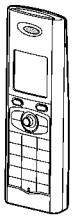
Note:

(*1) Refer to **Registering a Handset to a Base Unit** (P.23).

- Handset registration will not be reset.

8.3.2. Resetting only handset

The only handset is reset by doing the following steps ① to ④.



① Install the charged batteries into the handset.

② Lift the handset and press **【OFF】** to put the handset in standby mode.

③ Press [3], [5], [7] and [#] keys of the handset simultaneously until a confirmation tone is heard. (*2)

④ Remove the battery.

Note: (*2)

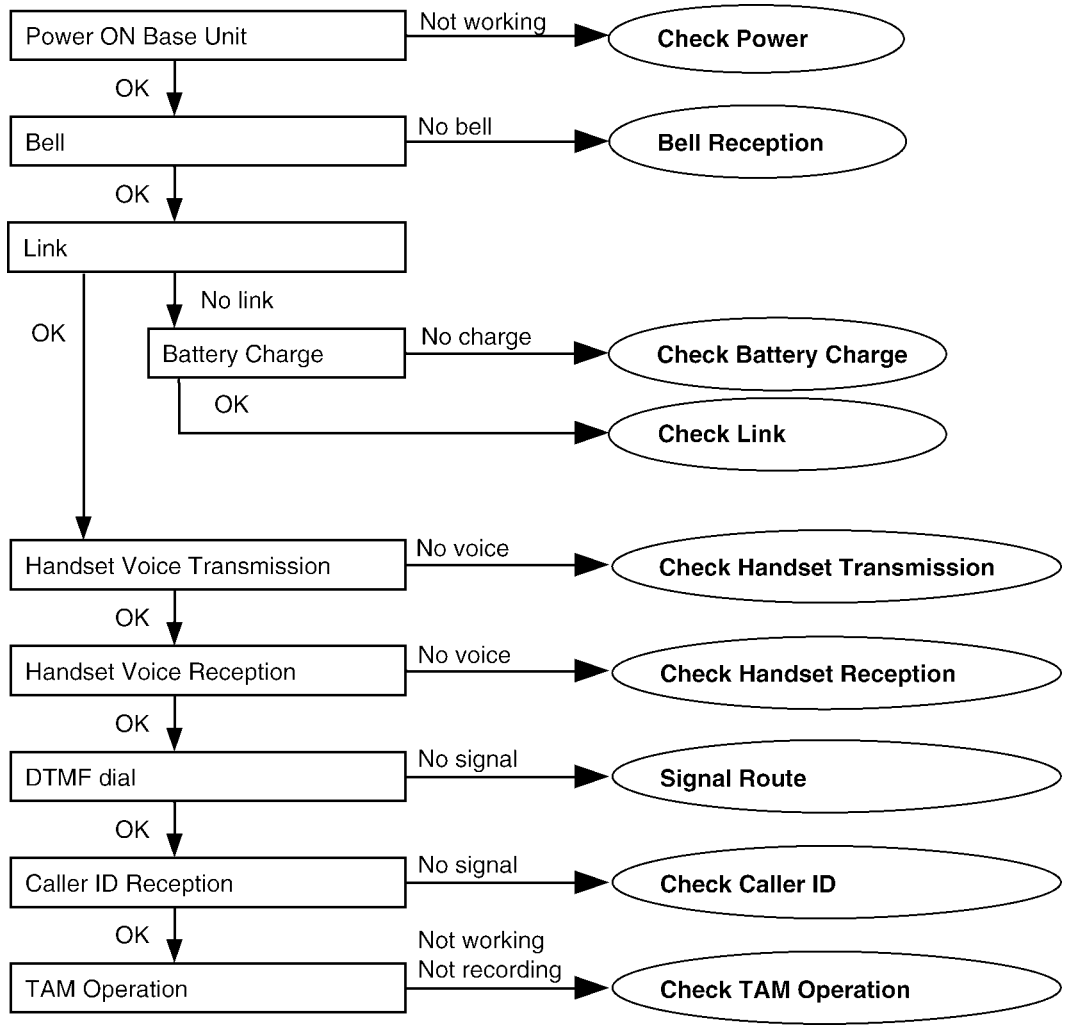
- The registration of the base unit and the handset are cancelled.
- If the handset needs to be registered to the base unit, refer to **Registering a Handset to a Base Unit** (P.23).
- If users do not bring the base unit with them, the registration procedure has to be done by users themselves.
- Caller ID data will not be reset.

8.3.3. Delete all handset registration of base unit

① Press and hold **【•))】 (LOCATOR)** button for more than 30 seconds.

9 Troubleshooting Guide

9.1. Troubleshooting Flowchart



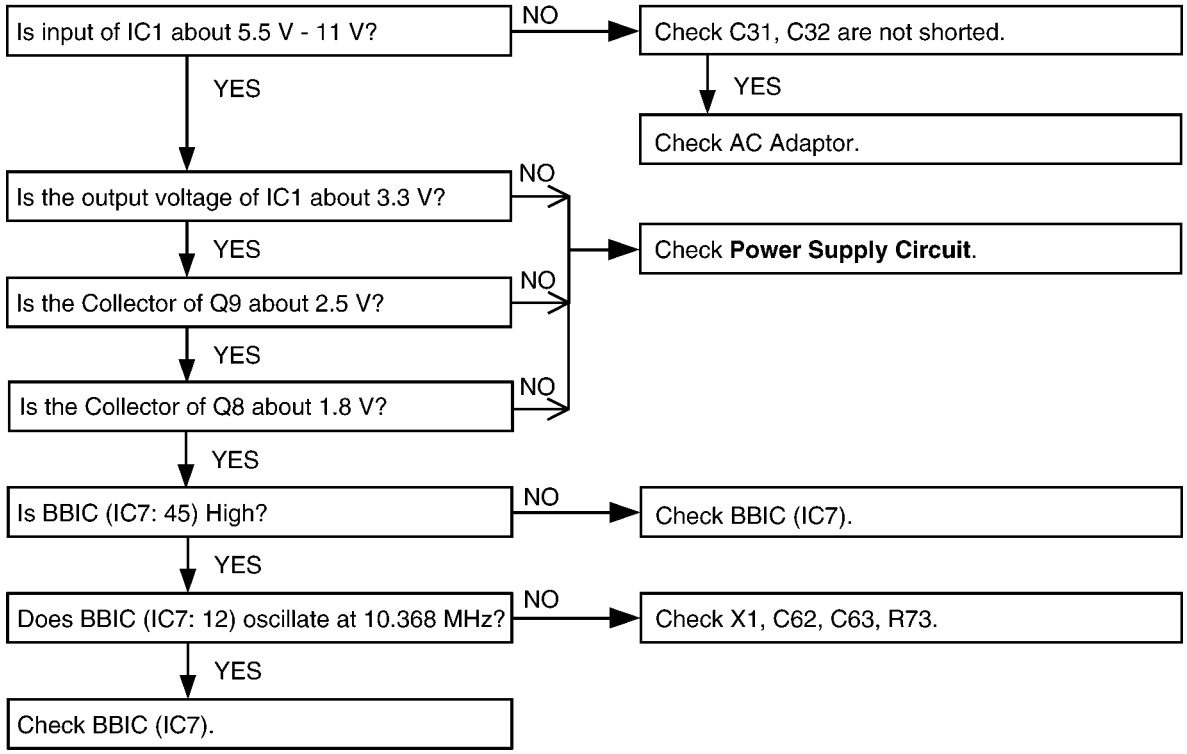
Cross Reference:

- **Check Power** (P.38)
- **Bell Reception** (P.46)
- **Check Battery Charge** (P.39)
- **Check Link** (P.40)
- **Check Handset Transmission** (P.46)
- **Check Handset Reception** (P.46)
- **Signal Route** (P.14)
- **Check Caller ID** (P.46)
- **Check TAM Operation** (P.47)

9.1.1. Check Power

9.1.1.1. Base Unit

Is the AC Adaptor inserted into AC outlet? (*1)



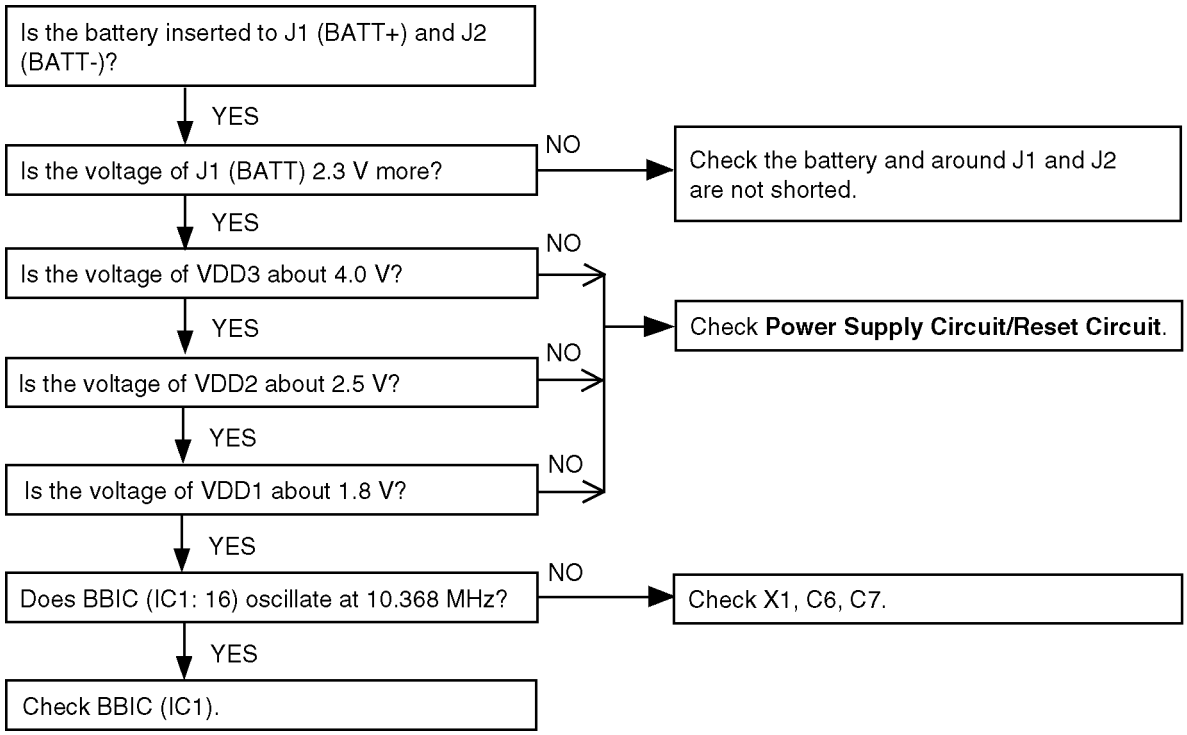
Cross Reference:

Power Supply Circuit (P.9)

Note:

(*1) Refer to **Specifications** (P.6) for part number and supply voltage of AC Adaptor.

9.1.1.2. Handset

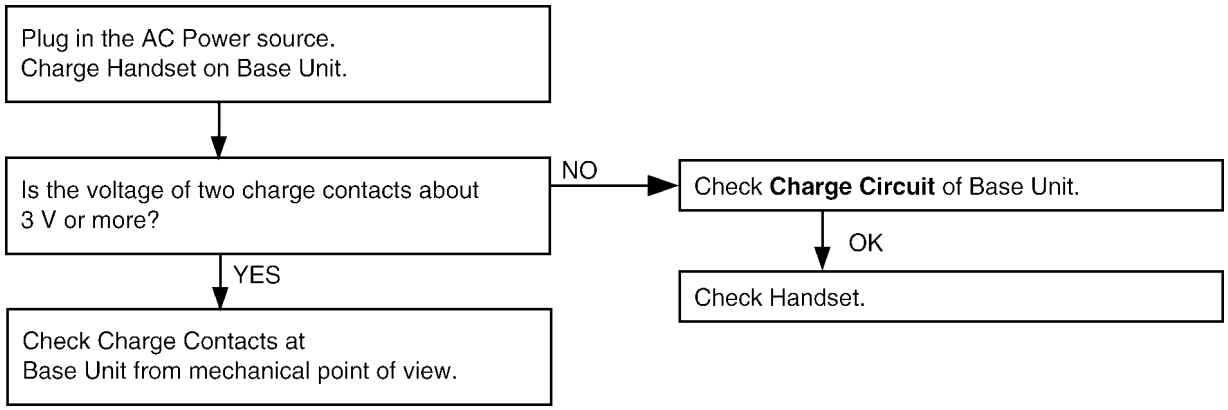

Is the battery inserted to J1 (BATT+) and J2 (BATT-)?
YES
Is the voltage of J1 (BATT) 2.3 V more?
NO
Check the battery and around J1 and J2 are not shorted.
YES
Is the voltage of VDD3 about 4.0 V?
NO
YES
Check Power Supply Circuit/Reset Circuit.
Is the voltage of VDD2 about 2.5 V?
NO
YES
Is the voltage of VDD1 about 1.8 V?
NO
YES
Does BBIC (IC1: 16) oscillate at 10.368 MHz?
NO
Check X1, C6, C7.
YES
Check BBIC (IC1).

Cross Reference:

Power Supply Circuit/Reset Circuit (P.12)

9.1.2. Check Battery Charge

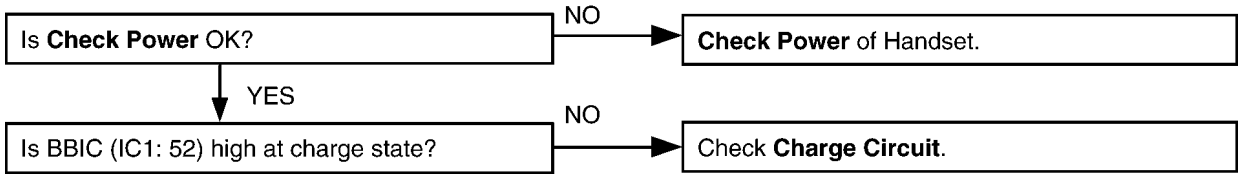
9.1.2.1. Base Unit


Plug in the AC Power source.
Charge Handset on Base Unit.
Is the voltage of two charge contacts about 3 V or more?
NO
Check **Charge Circuit** of Base Unit.
OK
Check Handset.
YES
Check Charge Contacts at Base Unit from mechanical point of view.

Cross Reference:

Charge Circuit (P.12)

9.1.2.2. Handset

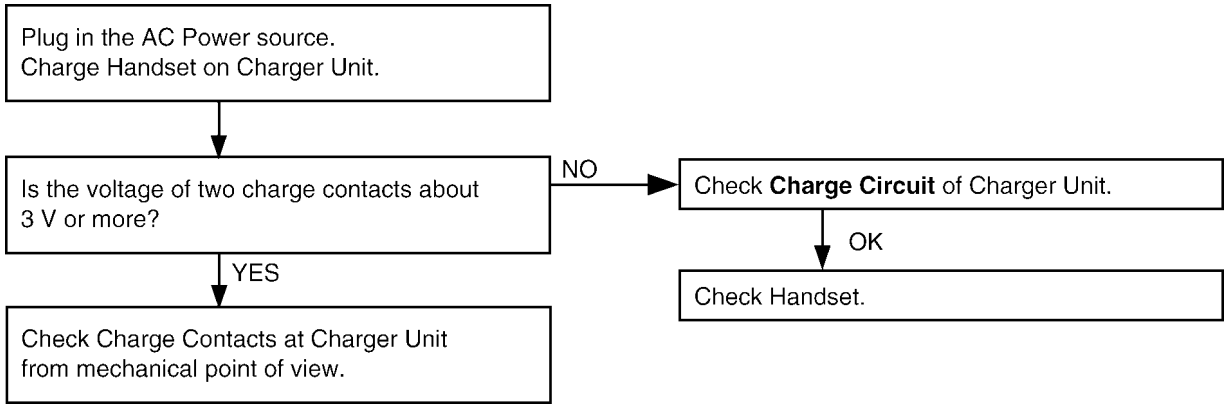


Cross Reference:

Check Power (P.38)

Charge Circuit (P.12)

9.1.2.3. Charger Unit

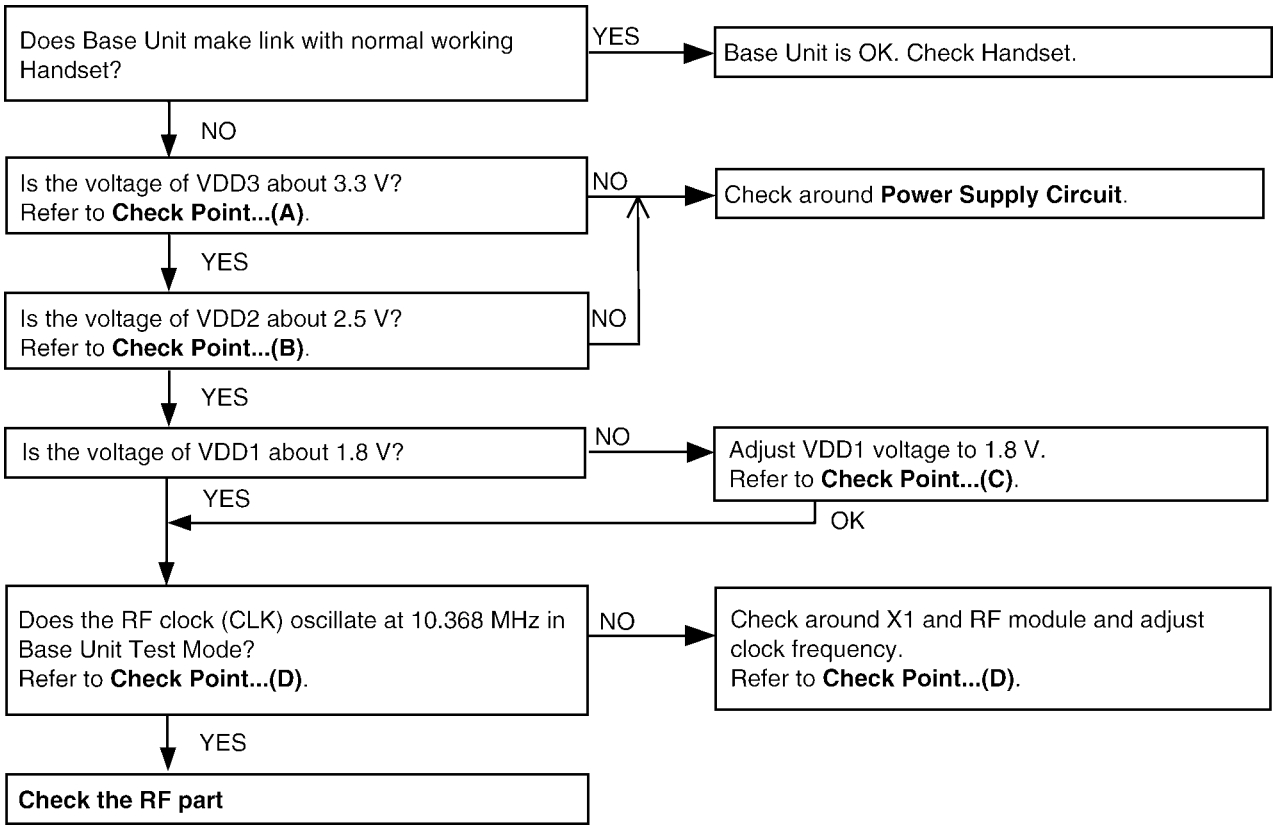

Plug in the AC Power source.
Charge Handset on Charger Unit.
Is the voltage of two charge contacts about 3 V or more?
NO
Check **Charge Circuit** of Charger Unit.
OK
Check Handset.
YES
Check Charge Contacts at Charger Unit from mechanical point of view.

Cross Reference:

Charge Circuit (P.12)

9.1.3. Check Link

9.1.3.1. Base Unit


Does Base Unit make link with normal working Handset?
YES
Base Unit is OK. Check Handset.
NO
Is the voltage of VDD3 about 3.3 V? Refer to **Check Point...(A)**.
NO
Check around **Power Supply Circuit**.
YES
Is the voltage of VDD2 about 2.5 V? Refer to **Check Point...(B)**.
NO
YES
Is the voltage of VDD1 about 1.8 V?
NO
Adjust VDD1 voltage to 1.8 V. Refer to **Check Point...(C)**.
YES
OK
Does the RF clock (CLK) oscillate at 10.368 MHz in Base Unit Test Mode? Refer to **Check Point...(D)**.
NO
Check around X1 and RF module and adjust clock frequency. Refer to **Check Point...(D)**.
YES
Check the RF part

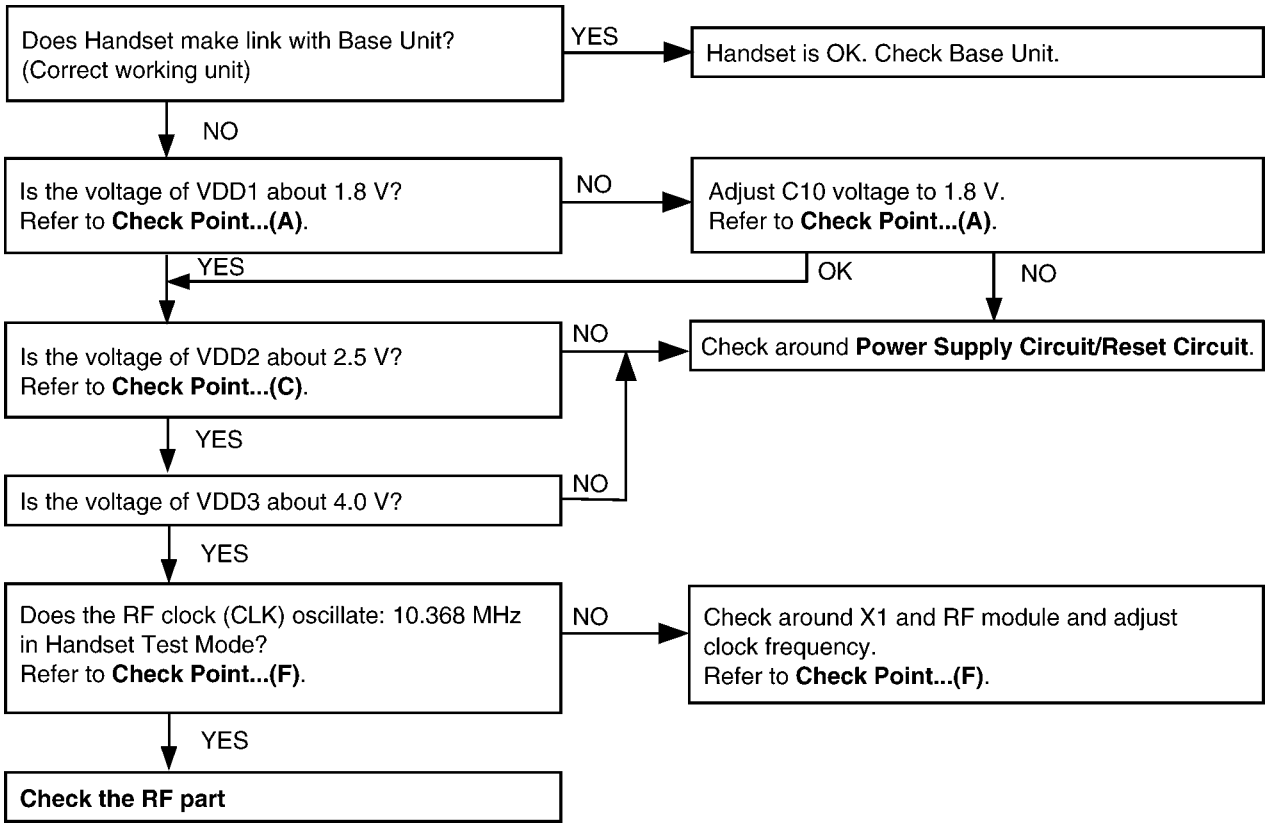
Cross Reference:

Check Point (Base Unit) (P.48)

Power Supply Circuit (P.9)

Check the RF part (P.42)

9.1.3.2. Handset



Cross Reference:

Check Point (Handset) (P.48)

Power Supply Circuit/Reset Circuit (P.12)

Check the RF part (P.42)

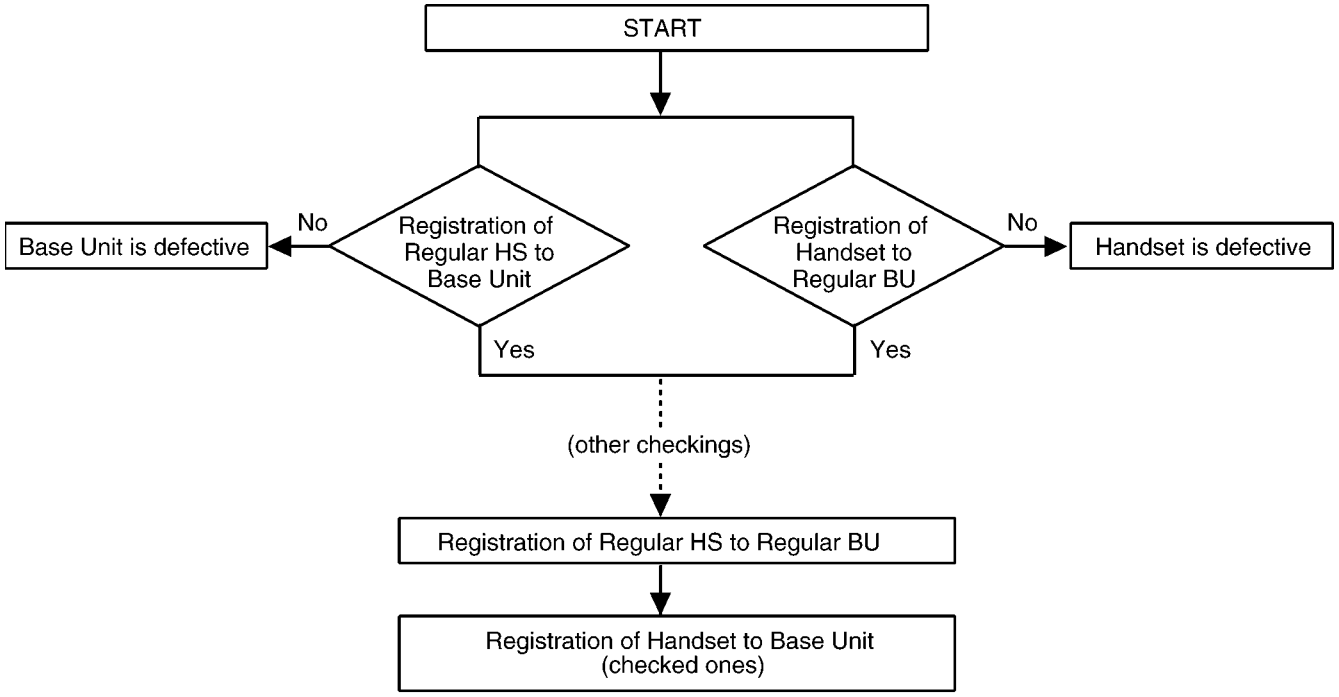
9.1.4. Check the RF part

9.1.4.1. Finding out the Defective part

1. Prepare Regular HS (Handset) and Regular BU (Base unit).
2. a. Re-register regular HS (Normal mode) to Base Unit (to be checked).
   If this operation fails in some ways, the Base Unit is defective.
   b. Re-register Handset (to be checked) to regular BU (Normal mode).
   If this operation fails in some ways, the Handset is defective.

After All the Checkings or Repairing

1. Re-register the checked Handset to the checked Base Unit, and Regular HS to Regular BU.

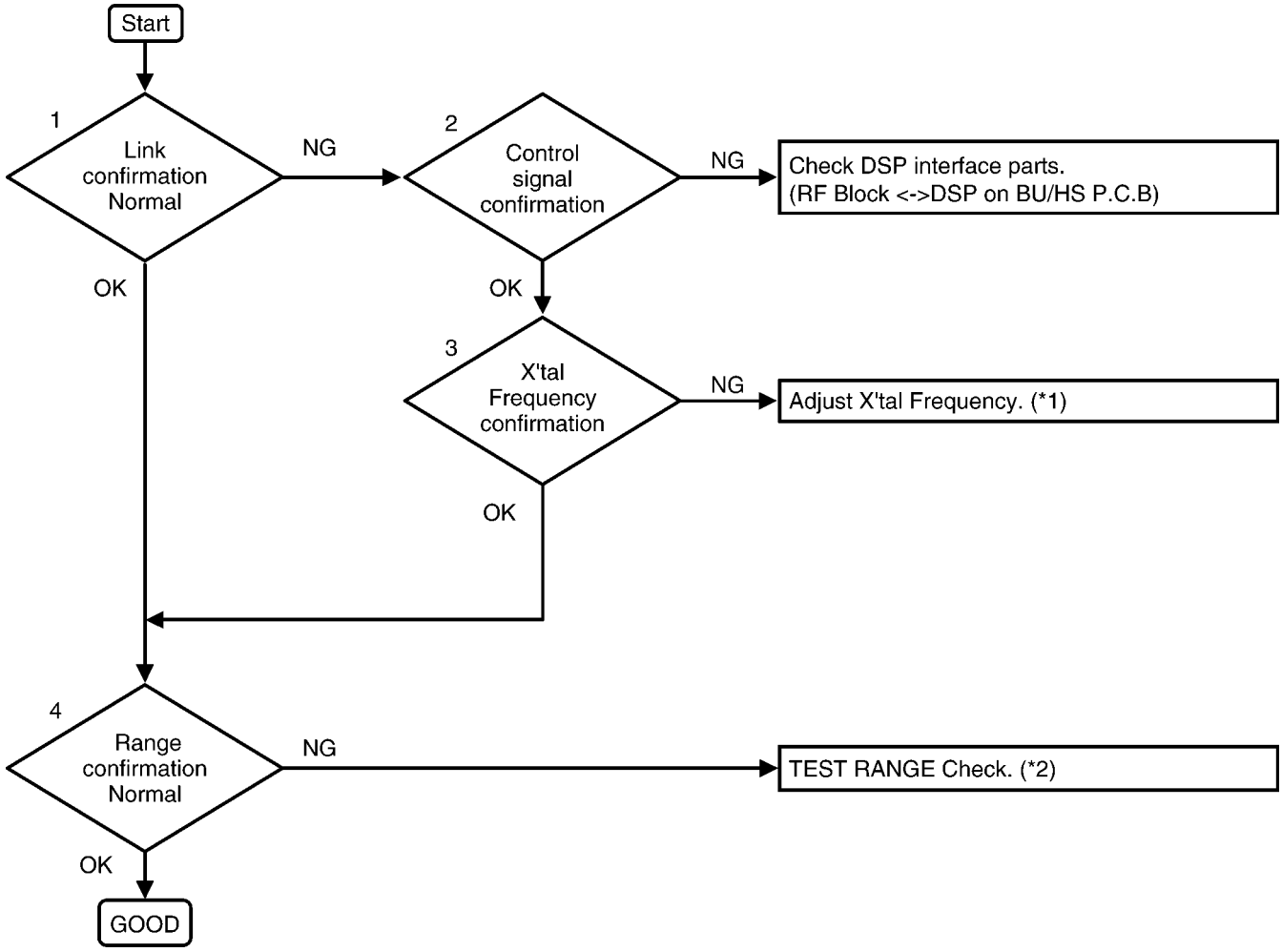


Note:

If you need to register a handset, refer to **Registering a Handset to a Base Unit** (P.23)

9.1.4.2. RF Check Flowchart

Each item (1 ~ 4) of RF Check Flowchart corresponds to **Check Table for RF part** (P.44).
Please refer to the each item.



Note:

(*1) Base unit - refer to (D) of **Check Point (Base Unit)** (P.48)
Handset - refer to (F) of **Check Point (Handset)** (P.48)

(*2) Refer to **TEST RANGE Check** (P.45)

9.1.4.3. Check Table for RF part

No.	Item	BU (Base Unit) Check	HS (Handset) Check
1	Link Confirmation Normal HS, BU Mode: [Normal mode]	1. Register Regular HS to BU (to be checked). (*1) 2. Press [Talk] key of the Regular HS to establish link.	1. Register HS (to be checked) to Regular BU. (*1) 2. Press [Talk] key of the HS to establish link.
2	Control signal confirmation HS, BU Mode: [Burst TX mode]	1. Check BBIC interface. (*2)	1. Check BBIC interface. (*2)
3	X'tal Frequency confirmation	1. Check X'tal Frequency. (*3) (10.368 MHz ± 100 Hz)	1. Check X'tal Frequency. (*4) (10.368 MHz ±100Hz)
4	Range Confirmation Normal HS, BU Mode: [Normal mode]	1. Register Regular HS to BU (to be checked). (*1) 2. Press [Talk] key of the Regular HS to establish link. 3. Compare the range of the BU (being checked) with that of the Regular BU.	1. Register HS (to be checked) to Regular BU. (*1) 2. Press [Talk] key of the HS to establish link. 3. Compare the range of the HS (being checked) with that of the Regular HS.

Note:

(*1) Refer to **Registering a Handset to a Base Unit** (P.23).

(*2) Refer to **RF-BBIC Interface Signal Wave Form** (P.45)

(*3) Refer to **Adjustment Standard (Base Unit)** (P.60)

(*4) Refer to **Adjustment Standard (Handset)** (P.64)

9.1.4.4. TEST RANGE Check

Circuit block which range is defective can be found by the following check.

Item	BU (Base Unit) Check	HS (Handset) Check
Range Confirmation TX TEST (TX Power check) HS, BU setting Checked unit: Low TX power (*1) Regular unit: High TX power (*1)	1. Register Regular HS to BU (to be checked). 2. Set TX Power of the BU and the Regular HS according to CHART1. 3. At distance of about 20 m between HS and BU, Link OK = TX Power of the BU is OK. No Link = TX Power of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set TX Power of the HS and the Regular BU according to CHART1. 3. At distance of about 20 m between HS and BU, Link OK = TX Power of the HS is OK. No Link = TX Power of the HS is NG.
Range Confirmation RX TEST (RX sensitivity check) HS, BU setting Checked unit: High TX power (*1) Regular unit: Low TX power (*1)	1. Register Regular HS to BU (to be checked). 2. Set TX Power of the BU and the Regular HS according to CHART1. 3. At distance of about 20 m between HS and BU, Link OK= RX Sensitivity of the BU is OK. No Link = RX Sensitivity of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set TX Power of the Checking HS and the Regular BU according to CHART1. 3. At distance of about 20 m between HS and BU, Link OK= RX Sensitivity of the HS is OK. No Link = RX Sensitivity of the HS is NG

CHART1: Setting of TX Power and RX Sensitivity in Range Confirmation TX TEST, RX TEST

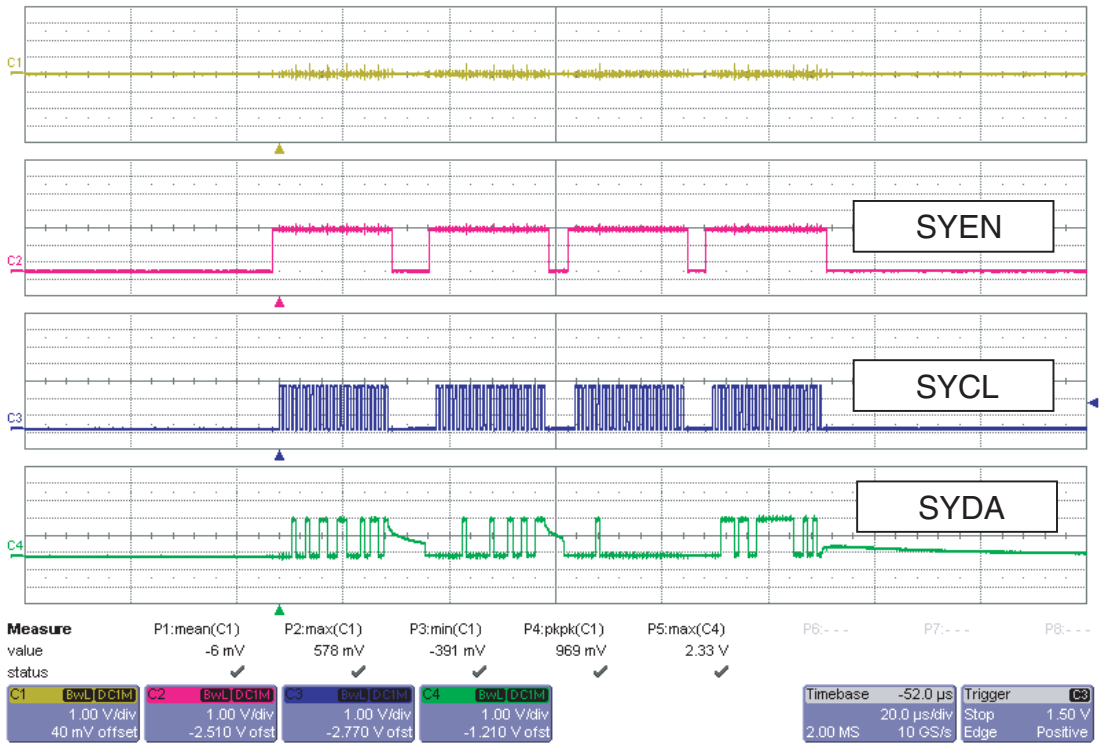
	BU (to be checked)	Regular_HS
	TX Power	TX Power
BU (Base Unit) TX Power Check	Low	High
BU (Base Unit) RX Sensitivity Check	High	**Low**

	HS (to be checked)	Regular_BU
	TX Power	TX Power
HS (Handset) TX Power Check	Low	High
HS (Handset) RX Sensitivity Check	High	**Low**

Note:

(*1) Refer to **Commands** (P.59) for Base unit, and refer to **Commands** (P.63) for Handset.

9.1.4.5. RF-BBIC Interface Signal Wave Form



9.1.5. Check Handset Transmission

Check Handset MIC.

↓ OK

Check CDL TX (HANDSET) in **Signal Route**.

Cross Reference:

Signal Route (P.14)

9.1.6. Check Handset Reception

Check Handset Speaker in **How to check the Handset Speaker or Receiver**.

↓ OK

Check CDL RX (HANDSET) in **Signal Route**.

Cross Reference:

How to Check the Handset Speaker or Receiver (P.66).

Signal Route (P.14)

9.1.7. Check Caller ID

Check Caller ID in **Signal Route**.

Cross Reference:

Signal Route (P.14)

9.1.8. Bell Reception

9.1.8.1. Base Unit

When bell signal is coming, is there bell sound signal at BBIC (IC7: 52, 60)?

NO → Check around C3, C4, C5, C6, R3, R4, R5, R6, C136, C137, R32, R33, R34, R35, C52, C53, C164, C165.

YES ↓

When bell signal is coming, is there bell sound signal at BBIC (IC7: 55)?

NO → Check around C54, C55, R36.

9.1.8.2. Handset

When bell signal coming, is there bell sound signal at BBIC (IC1: 30, 32)?

NO → Check BBIC (IC1).

YES ↓

When bell signal coming, is there bell sound signal at SP_TEST1, SP_TEST2?

NO → Check around SP-TEST1, SP-TEST2.

YES ↓

Does the bell sound from SPEAKER?

NO → Check cable of SPEAKER and resistance value of SPEAKER.

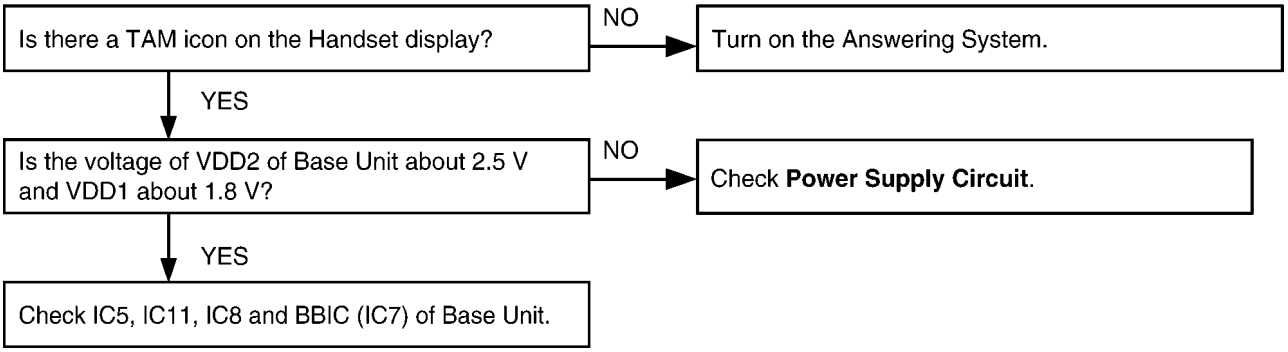
Cross Reference:

Telephone Line Interface (P.10)

Check Link (P.40)

How to Check the Handset Speaker or Receiver (P.66)

9.1.9. Check TAM Operation


Is there a TAM icon on the Handset display?
NO
Turn on the Answering System.
YES
Is the voltage of VDD2 of Base Unit about 2.5 V and VDD1 about 1.8 V?
NO
Check **Power Supply Circuit**.
YES
Check IC5, IC11, IC8 and BBIC (IC7) of Base Unit.

A) How to change the Auto Disconnect activation (time)

Some Telephone Company lines (fiber or cable) ON Hook and OFF Hook voltages are lower than conventional lines, which may cause a malfunction of Auto Disconnect detection. To solve this problem, try changing the Auto Disconnect activation through the procedures below.

Auto Disconnect detect	PROCEDURE at Stand-by mode
Enable*1 [default]	“STOP” + “ANSWER” + “SKIP” simultaneously
Disable*2	“STOP” + “ANSWER” + “REPEAT” simultaneously

Note:

*1 Auto Disconnect doesn't detect for the first 2 seconds.

*2 If the “Disable” is selected, even if the parallel-connected telephone is OFF HOOK, the line isn’t disconnected.

B) How to change the VOX level

It makes easier to detect a small voice (caller) by raising the sensitivity of VOX level. Therefore, the recording of TAM is not turned off during a detection.

VOX Level sensitivity	PROCEDURE
Normal [default]	“STOP” + “LOCATOR” + “REPEAT” simultaneously
6 dB Up	“STOP” + “LOCATOR” + “SKIP” simultaneously

Cross Reference:

Power Supply Circuit (P.9)

9.2. Troubleshooting by Symptom (Base Unit)

9.2.1. Check Point (Base Unit)

Please follow the items below after repairing.

Note:

After the measuring, suck up the solder of TP.

*: **PC Setting** (P.58) is required beforehand.

The connections of simulator equipment are as shown in **Adjustment Standard (Base Unit)** (P.60).

	Items	Check Point	Procedure	Check or Replace Parts
(**A**)	3.3 V Supply Confirmation	VDD3	1. Confirm that the voltage between test point VDD3 and GND is 3.3 V ± 0.2 V.	IC1, C30, C32, R38, R39, C36, C37
(**B**)	2.5 V Supply Confirmation	VDD2	1. Confirm that the voltage between test point VDD2 and GND is 2.5 V ± 0.2 V.	Q9, C70, C71
(**C**)	1.8 V Supply Confirmation	VDD1	1. Confirm that the voltage between test point VDD1 and GND is 1.8 V ± 0.1 V.	Q8, R72, D12, C64, C68
(**D**)*	BBIC Clock Adjustment	CLK	1. Input Command “rdeeprom 00 01 01”, then you can confirm the current value. 2. If the frequency is not 10.368 MHz ± 100Hz, adjust the frequency of CLK executing the command “setfreq xx (where xx is the value)” so that the reading of the frequency counter is 10.368000 MHz ± 10 Hz.	IC10, C111, C112, X1, R73, C62, C63

9.3. Troubleshooting by Symptom (Handset)

9.3.1. Check Point (Handset)

Please follow the items below after repairing.

Note:

After the measuring, suck up the solder of TP.

*: **Batch file Settings** (P.63) is required beforehand.

The connections of adjustment equipment are as shown in **Adjustment Standard (Handset)** (P.64).

	Items	Check Point	Procedure	Check or Replace Parts
(**A**)*	1.8 V Supply Adjustment	VDD1	1. Confirm that the voltage between test point 1.8 V and GND is 1.8 V ± 0.02 V. 2. Execute the command “bandgap”, then check the current value. 3. Adjust the 1.8V voltage of VDD1 executing command “bandgap XX“(XX is the value).	IC1, Q2, C10
(**B**)	DC/DC Supply Confirmation	VDD3	1. Confirm that the voltage between test point VDD3 and GND is 4.0 V ± 0.3 V (Backlight is ON).	IC1, F1, C1, C2, C3, R1, Q1, D1, L1
(**C**)	2.5 V Supply Confirmation	VDD2	1. Confirm that the voltage between test point 2.5 V and GND is 2.5 V ± 0.1 V.	IC1, Q3, C5
(**D**)	Charge Control Check & Charge Current Monitor Check	-	1. Apply 3.5 V between J3(+) and J4(-) with DC power supply and set current limit to 250 mA. 2. Confirm that the current limit LED of DC power supply is ON/OFF. 3. Decrease current limit of DC power supply to 100 mA. 4. Confirm that the current limit LED of DC power supply is stable. (Current limiter is ON.) (If charge control cannot be confirmed by this procedure, please use battery to handset power supply and try again.)	IC1, Q4, Q5, Q9, D7, D8, L4, L5, R5, R6, R7, F1
(**E**)	Battery Low Confirmation	-	1. Apply 2.40 V between BATT(+) and BATT(-). 2. Confirm that there is no flashing of Battery Icon. 3. Apply 2.25 V ± 0.08 V between BATT(+) and BATT(-). 4. Confirm that there is flashing of Battery Icon.	IC1, F1, C1 C3, R12
(**F**)*	BBIC Clock Adjustment	CLK	1. Apply 2.6 V between BATT(+) and BATT(-) with DC power. 2. Execute the command “conttx”. 3. Input Command “rdeeprom 00 01 01”, then you can confirm the current value. 4. If the frequency is not 10.368 MHz ± 100Hz, adjust the frequency of CLK executing the command “setfreq xx (where xx is the value)” so that the reading of the frequency counter is 10.368000 MHz ± 10 Hz. Note: CLK is displayed only for a few seconds when executing the command “conttx” after battery is inserted.	IC1, X1, C6, C7, IC4, C57

9.4. How to Replace the Flat Package IC

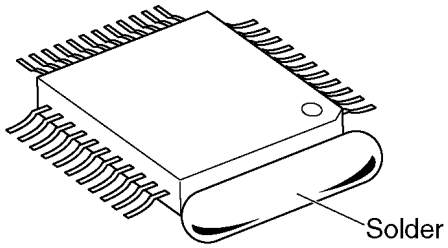
Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

9.4.1. Preparation

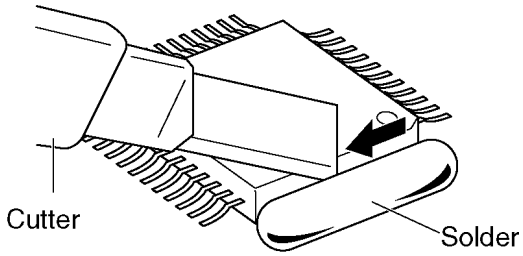
- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700 °F ± 20 °F (370 °C ± 10 °C)
  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux
  Recommended Flux: Specific Gravity → 0.82.
  Type → RMA (lower residue, non-cleaning type)
  Note: See **About Lead Free Solder (Pbf: Pb free)** (P.4)

9.4.2. How to Remove the IC

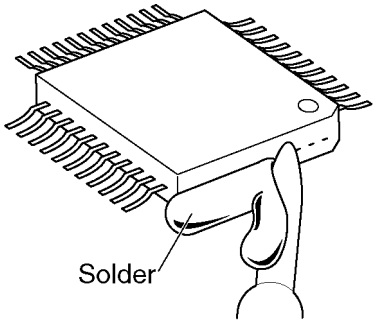
1. Put plenty of solder on the IC pins so that the pins can be completely covered.
   Note:
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



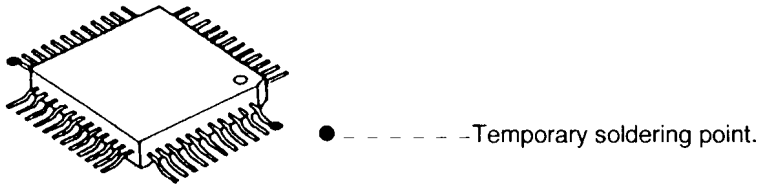
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the board with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

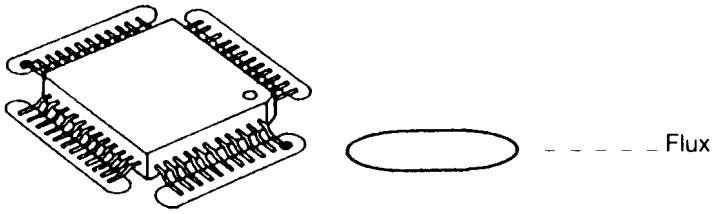
9.4.3. How to Install the IC

1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

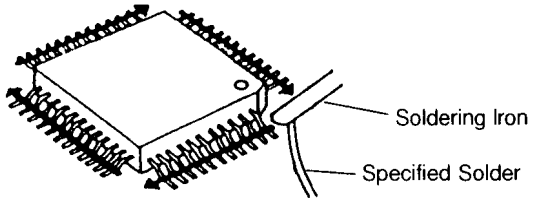


*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux to all pins of the FLAT PACKAGE IC.

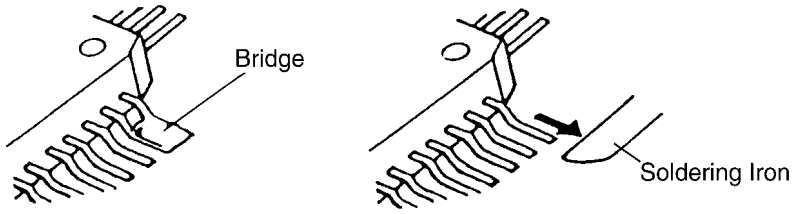


3. Solder the pins, sliding the soldering iron in the direction of the arrow.



9.4.4. How to Remove a Solder Bridge

1. Lightly resolder the bridged portion.
2. Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



9.5. How to Replace the LLP (Leadless Leadframe Package) IC

9.5.1. Preparation

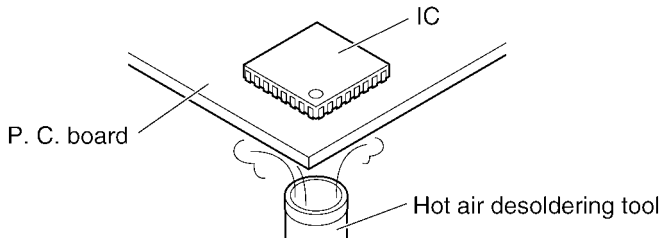
- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700°F ± 20°F (370°C ± 10°C)
  Note:
  We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Hot Air Desoldering Tool
  Temperature: 608°F ± 68°F (320°C ± 20°C)

9.5.2. Caution

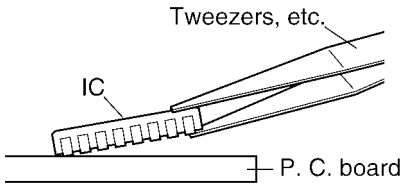
- To replace the IC efficiently, choose the right sized nozzle of the hot air desoldering tool that matches the IC package.
- Be careful about the temperature of the hot air desoldering tool not to damage the PCB and/or IC.

9.5.3. How to Remove the IC

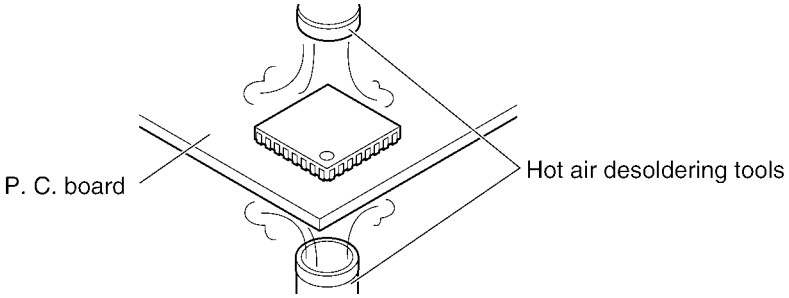
1. Heat the IC with a hot air desoldering tool through the P. C. board.



2. Pick up the IC with tweezers, etc. when the solder is melted completely.
   Note:
   - Be careful not to touch the peripheral parts with tweezers, etc. They are unstable.



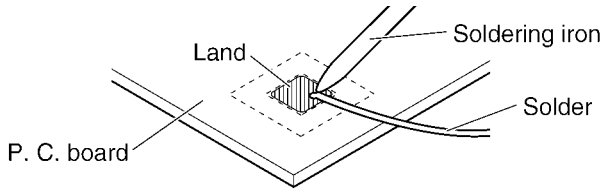
When it is hard to melt the solder completely, heat it with a hot air desoldering tool through the IC besides through the P. C. board.



3. After removing the IC, clean the P. C. board of residual solder.

9.5.4. How to Install the IC

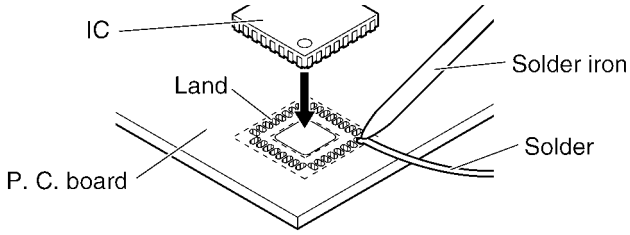
1. Place the solder a little on the land where the radiation GND pad on IC bottom is to be attached.



2. Place the solder a little on the land where IC pins are to be attached, then place the IC.

Note:

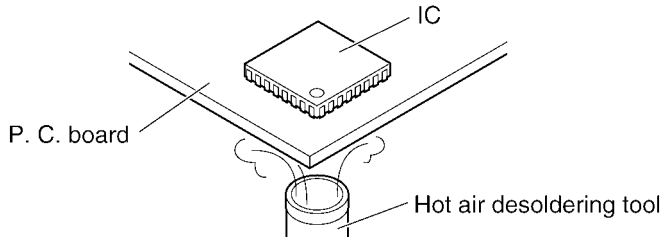
• When placing the IC, the positioning should be done very carefully.



3. Heat the IC with a hot air desoldering tool through the P. C. board until the solder on IC bottom is melted.

Note:

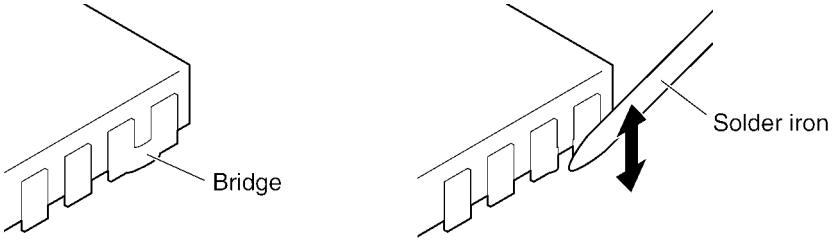
• Be sure to place it precisely, controlling the air volume of the hot air desoldering tool.



4. After soldering, confirm there are no short and open circuits with visual inspection.

9.5.5. How to Remove a Solder Bridge

When a Solder Bridge is found after soldering the bottom of the IC, remove it with a soldering iron.

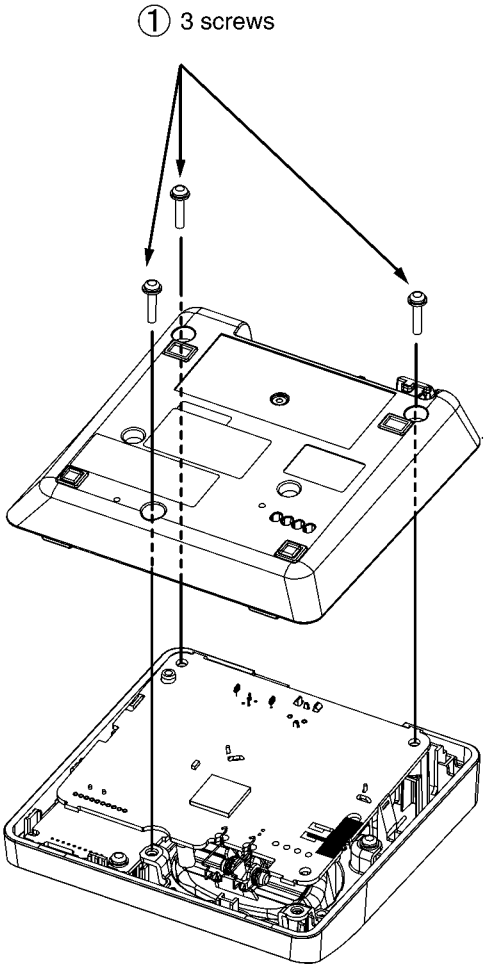


10 Disassembly and Assembly Instructions

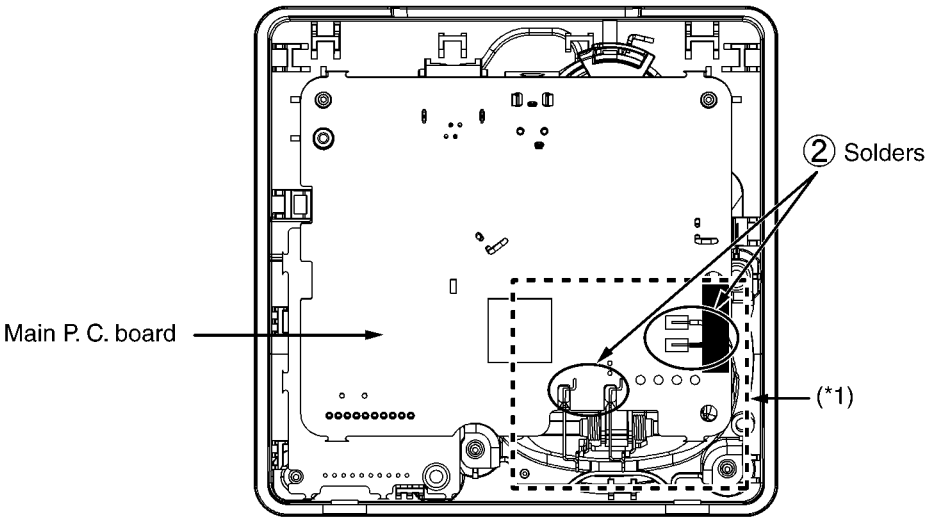
10.1. Disassembly Instructions

10.1.1. Base Unit

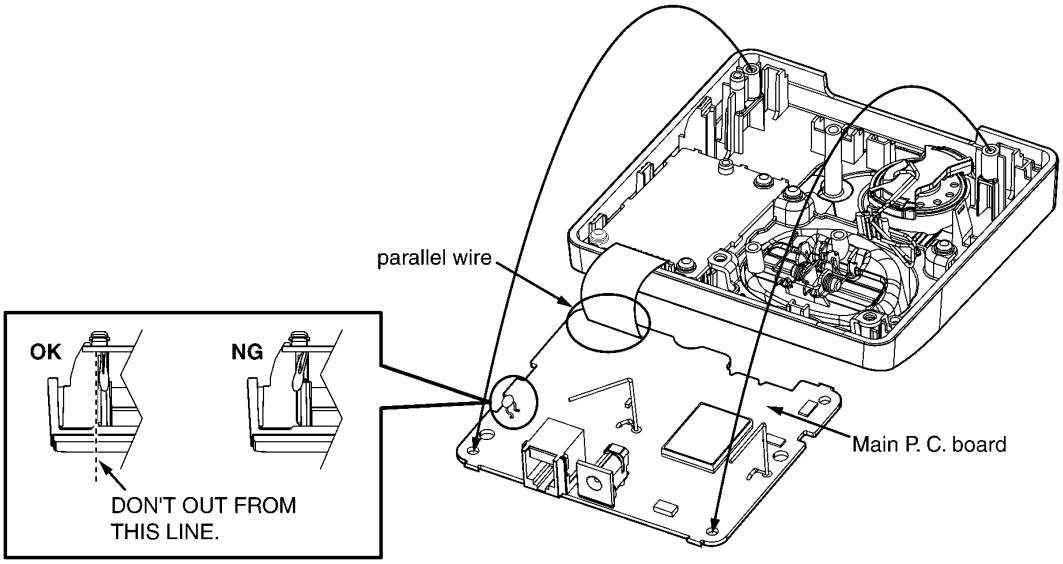
① **Remove the 3 screws to remove the cabinet cover.**



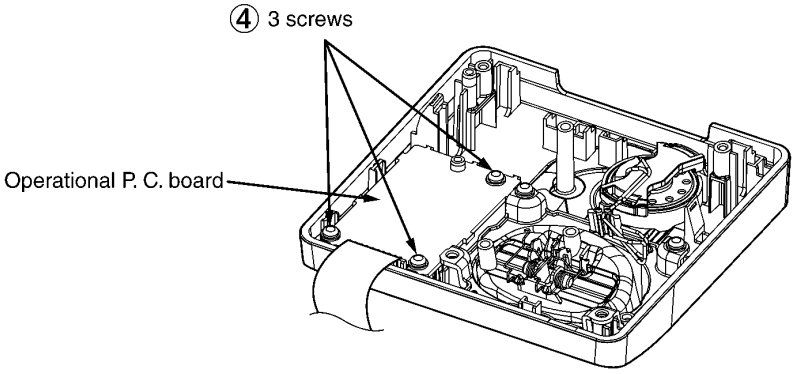
② **Remove the solders.**



③ **Remove the parallel wire to remove the main P.C. board.**

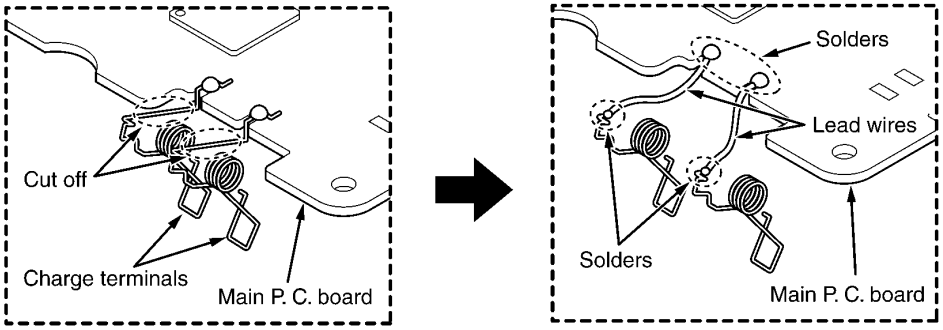


④ **Remove the 3 screws to remove the operational P.C. board.**



<Note for Disassembly>

(*1) If the Main P. C. board is pulled by force and the charge terminals are bent or broken, please refer to the following.

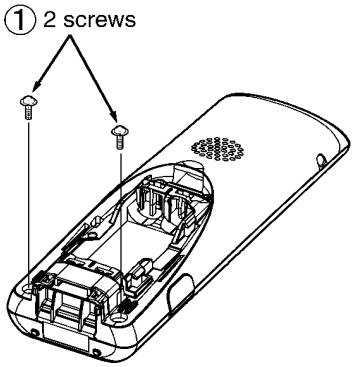


① **Cut the charge terminals as shown in the above figure.**

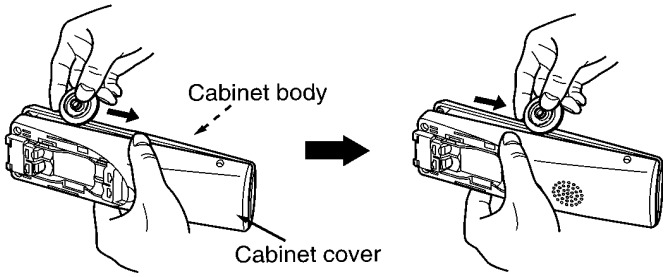
② **Connect the charge terminals to the Main P. C. board by lead wires.**

10.1.2. Handset

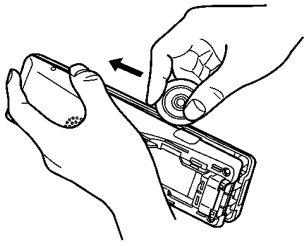
① **Remove the 2 screws.**



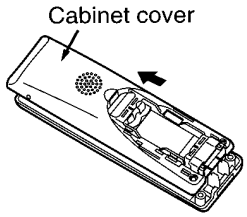
② **Insert a JIG (PQDJ10006Y) between the cabinet body and the cabinet cover, then pull it along the gap to open the cabinet.**



③ **Likewise, open the other side of the cabinet.**



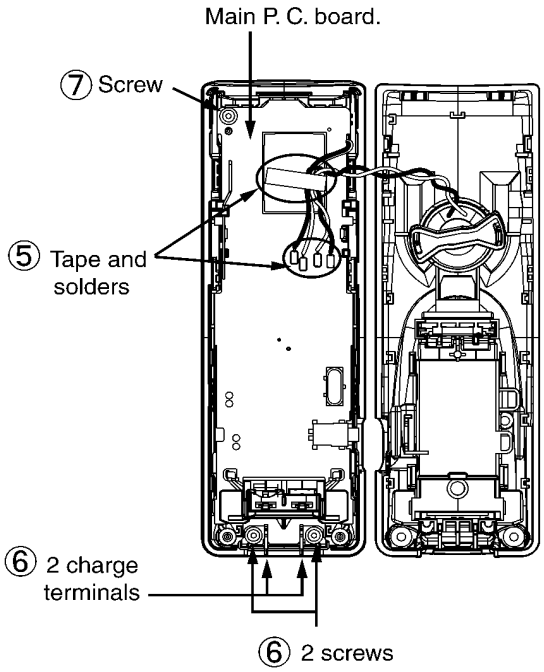
④ **Remove the cabinet cover by pushing it upward.**



⑤ **Remove the tape and solders.**

⑥ **Remove the 2 screws to remove the 2 charge terminals.**

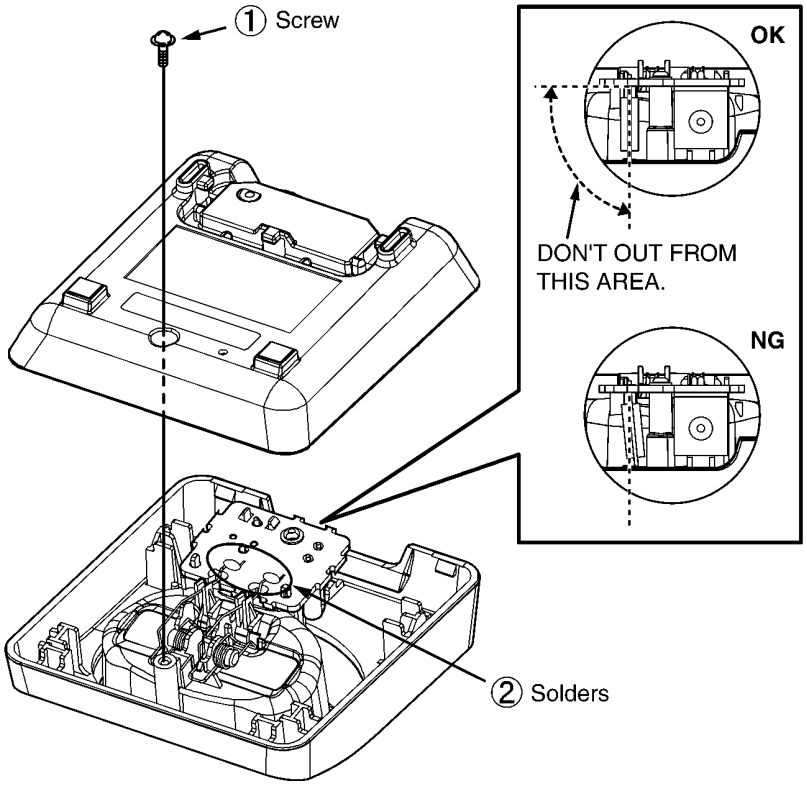
⑦ **Remove the screw to remove the main P. C. board.**



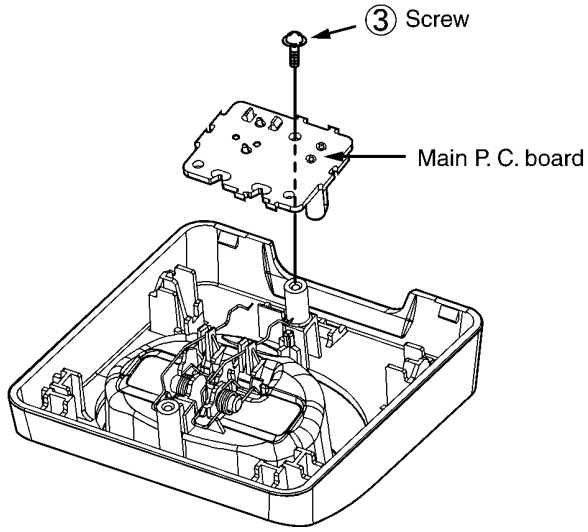
10.1.3. Charger Unit

① **Remove the screw to remove the cabinet cover.**

② **Remove the solders.**



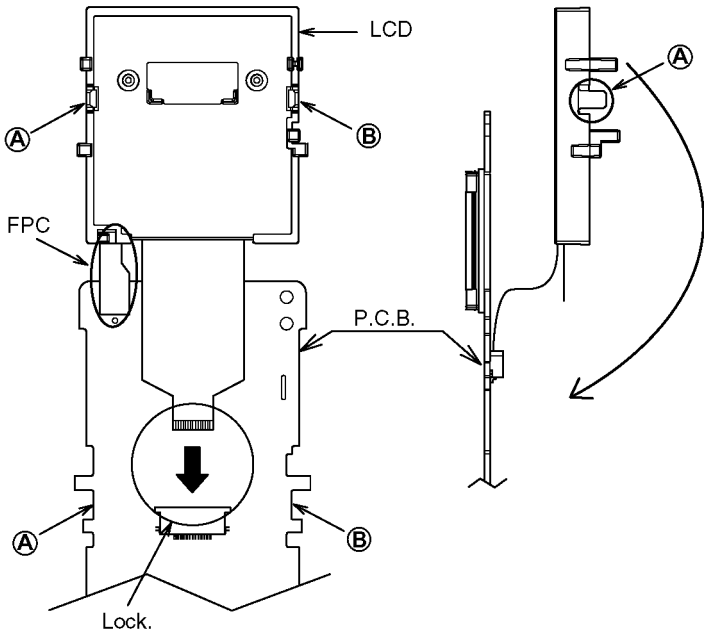
③ **Remove the screw to remove the main P. C. board.**



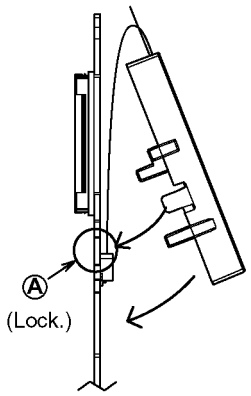
10.2. Assembly Instructions

10.2.1. Fix the LCD to the Main P.C.Board (Handset)

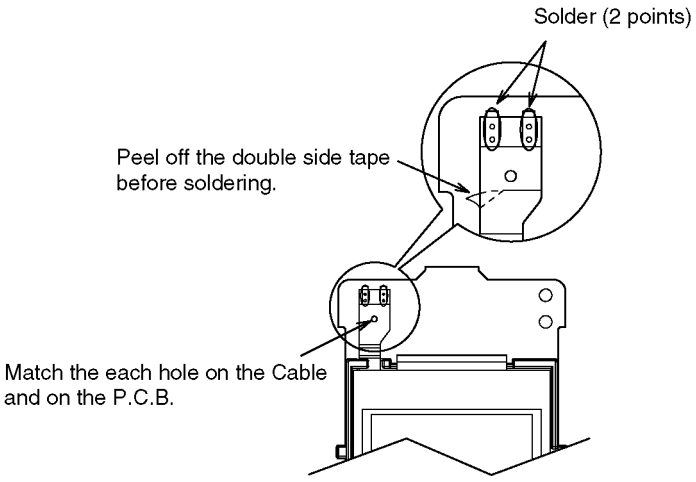
① Attach LCD to P.C.B.
*When attaching the LCD holder,
don't pull the FPC (Flexible Print Circuit).



② Locate the Flat Cable inside as shown.



③ Solder the narrow Cable to the P.C.B.
*When soldering, don't give the load to the FPC.



11 Measurements and Adjustments

11.1. The Setting Method of JIG (Base Unit)

11.1.1. Preparation

11.1.1.1. Equipment Required

- Frequency counter: It must be precise enough to measure intervals of 1 Hz (precision; ±4 ppm). Hewlett Packard, 53131A is recommended.
- Digital multi-meter (DMM): It must be able to measure voltage and current.
- Oscilloscope

11.1.1.2. JIG and PC

- Serial JIG
  JIG Cable: PQZZ1CD300E
- PC which runs in DOS mode
- **Batch file CD-ROM** for setting: PQZZTG8231M

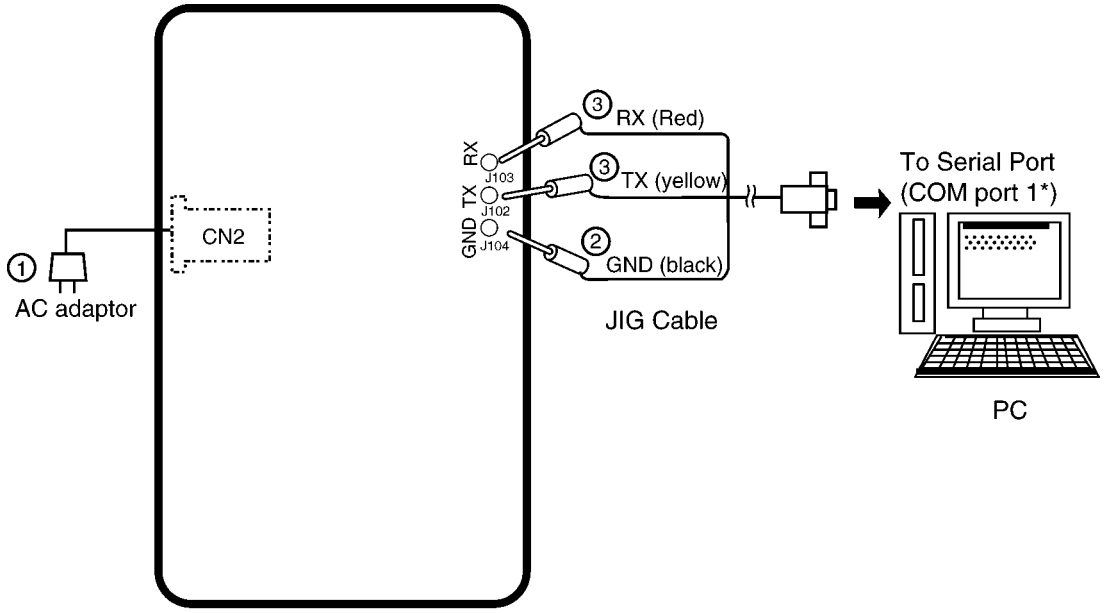
11.1.2. PC Setting

11.1.2.1. Connections

①Connect the AC adaptor to CN2 (base unit).

②Connect the JIG Cable GND (black) to J104.

③Connect the JIG Cable RX (red) to J103 and TX (yellow) to J102.



Note:

*: COM port names may vary depending on what your PC calls it.

11.1.2.2. Batch file Settings

1. Insert the Batch file CD-ROM into CD-ROM drive and copy PQZZTG**** folder to your PC (example: D drive).

2. Open an MS-DOS mode window.

<Example for Windows>

On your computer, click **[Start]**, select **Programs** (**All Programs** for Windows XP/Windows Server 2003), then click
MS-DOS Prompt. (for Windows 95/Windows 98)
Or
Accessories-MS-DOS Prompt. (for Windows Me)
Or
Command Prompt. (for Windows NT 4.0)
Or
Accessories-Command Prompt.
(for Windows 2000/Windows XP/Windows Server 2003)

3. At the DOS prompt, type "**D:**" (for example) to select the drive, then press the **Enter** key.

4. Type "**CD ¥PQZZTG****"**, then press the **Enter** key.

5. Type "**SET_COM=X**", then press the **Enter** key
(**X**: COM port number used for the serial connection on your PC).

6. Type "**READID**", then press the **Enter** key.
- If any error messages appear, change the port number or check the cable connection.
- If any value appear, go to next step.

7. Type "**DOSKEY**", then press the **Enter** key.

<Example: correct setting>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PQZZTG****
D: ¥PQZZTG**** >SET_COM=X
D: ¥PQZZTG****>READID
00 52 4F A8 A8
D: ¥PQZZTG****>DOSKEY
D: ¥PQZZTG****>
```

<Example: incorrect setting>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PQZZTG****
D: ¥PQZZTG**** >SET_COM=X
D: ¥PQZZTG****>READID
   CreateFile error
ERROR 10: Can't open serial port
D: ¥PQZZTG ****>
```

Note:
- "****" varies depending on the country.

11.1.2.3. Commands

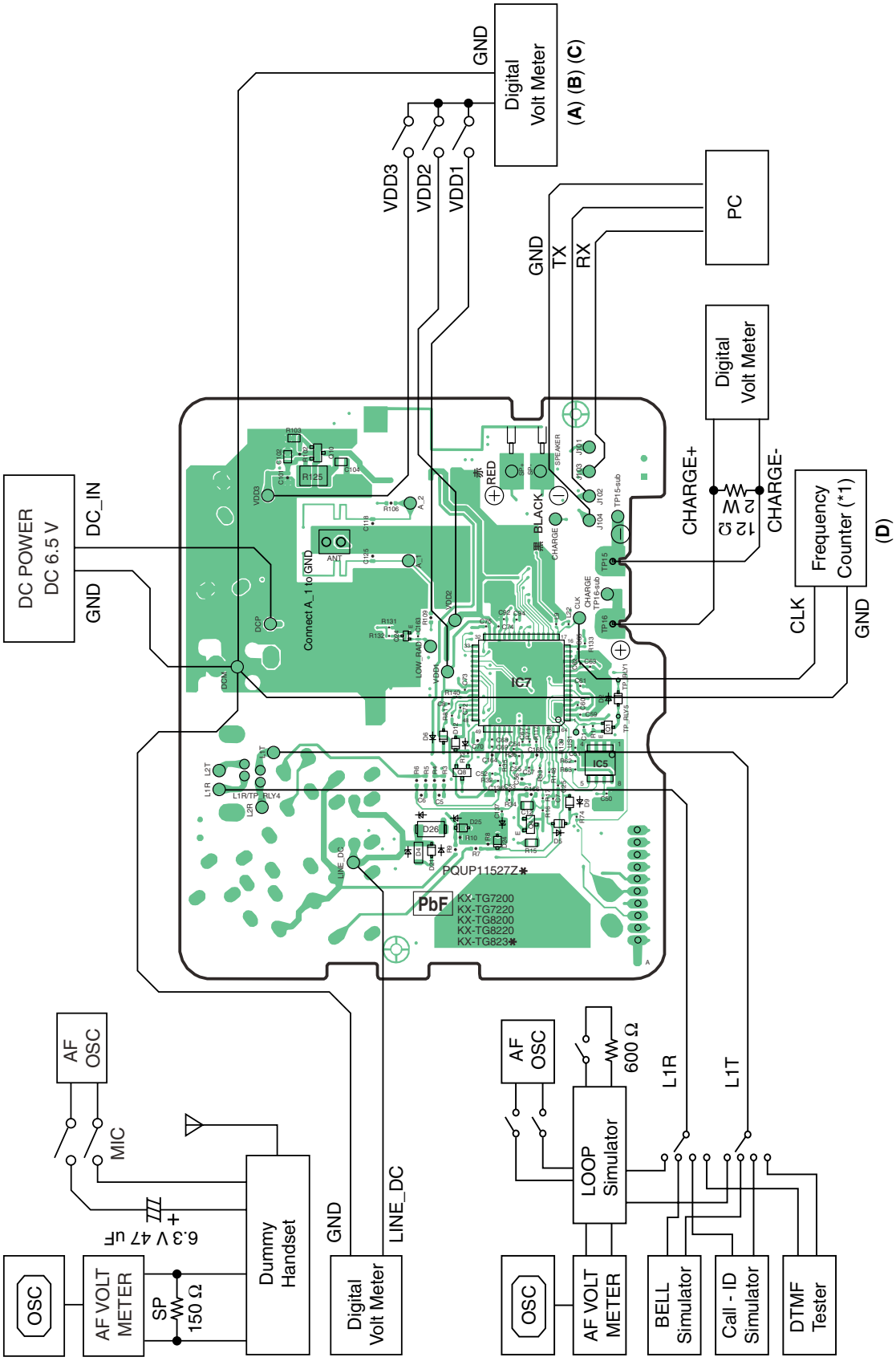
See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of EEPROM	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
setfreq	Adjust Frequency of RFIC	Type "setfreq nn".
hookoff	Off-hook mode on Base	Type "hookoff".
hookon	On-hook mode on Base	Type "hookon".
getchk	Read checksum	Type "getchk".
wreeprom	Write the data of EEPROM	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.
bursttx	Burst TX mode	Type "bursttx"
testrx	Test RX mode	Type "testrx"
tph	High TX power	Type "tph"
tpl	Low TX power	Type "tpl"

11.2. Adjustment Standard (Base Unit)

When connecting the simulator equipment for checking, please refer to below.

11.2.1. Flow Solder Side View



Note:

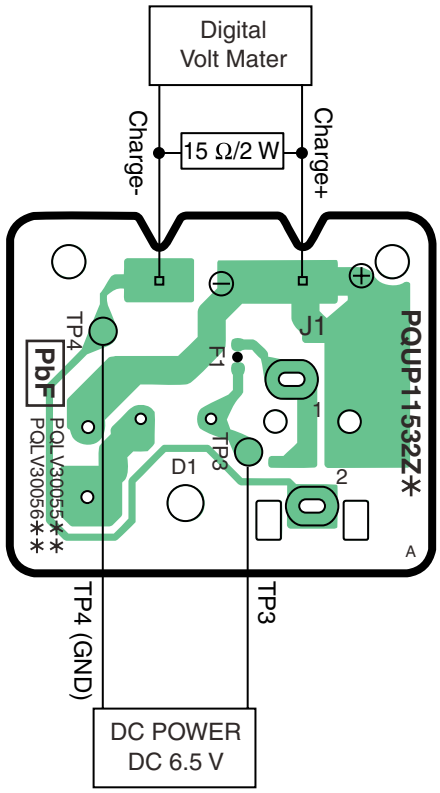
(**A**) - (**D**) is referred to **Check Point (Base Unit)** (P.48)

(*1) is referred to No.3 of **Check Table for RF part** (P.44)

11.3. Adjustment Standard (Charger Unit)

When connecting the simulator equipment for checking, please refer to below.

11.3.1. Flow Solder Side View



11.4. The Setting Method of JIG (Handset)

11.4.1. Preparation

11.4.1.1. Equipment Required

- Frequency counter: It must be precise enough to measure intervals of 1 Hz (precision; ±4 ppm).
  Hewlett Packard, 53131A is recommended.
- DC power: It must be able to output at least 1 A current under 2.4 V for Handset.
- Digital multi-meter (DMM): It must be able to measure voltage and current.
- Oscilloscope

11.4.1.2. JIG and PC

- Serial JIG
  JIG Cable: PQZZ1CD300E
- PC which runs in DOS mode.
- **Batch file CD-ROM** for setting: PQZZTG8231M

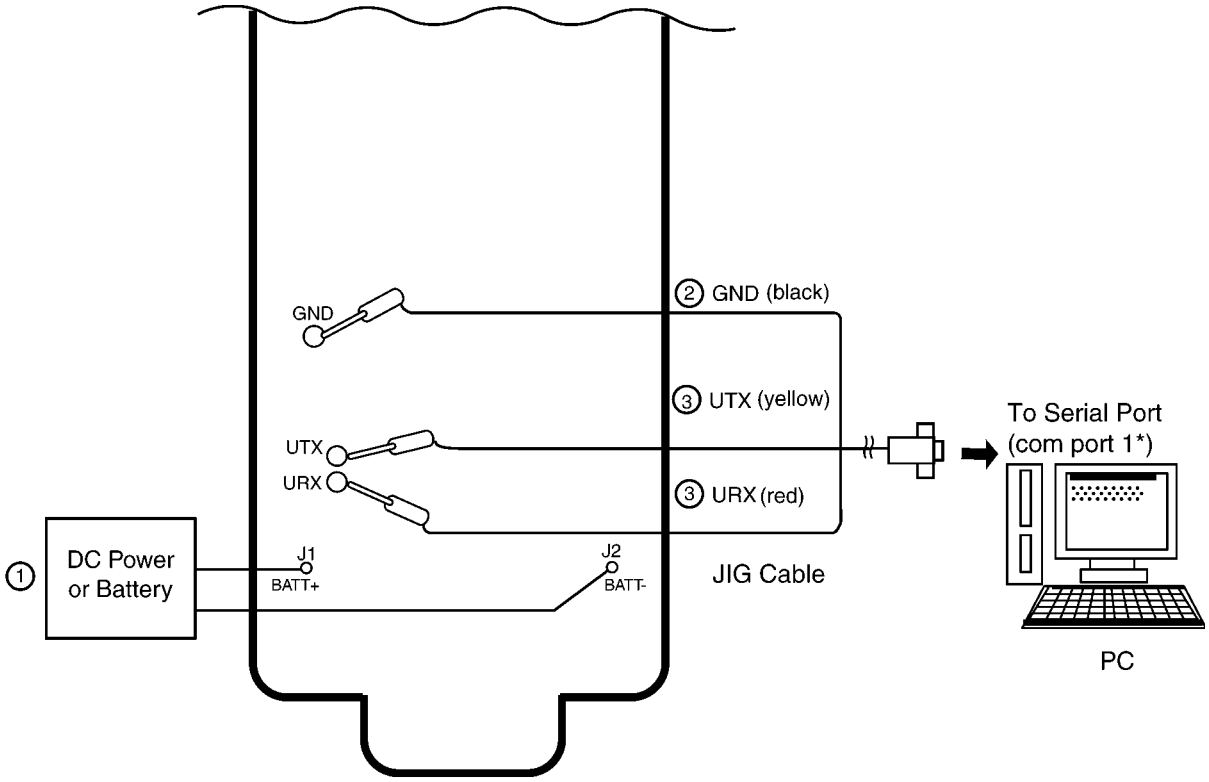
11.4.2. PC Setting

11.4.2.1. Connections

①Connect the DC Power or Battery to J1 (BATT+) and J2 (BATT-) (Handset).

②Connect the JIG cable GND (black) to GND.

③Connect the JIG cable UTX (yellow) to UTX and URX (red) to URX.



Note:

*: Com port names may vary depending on what your PC calls it.

11.4.2.2. Batch file Settings

1. Insert the Batch file CD-ROM into CD-ROM drive and copy PQZZTG***** folder to your PC (example: D drive).

2. Open an MS-DOS mode window.

<Example for Windows>

On your computer, click **[Start]**, select **Programs** (**All Programs** for Windows XP/Windows Server 2003), then click
MS-DOS Prompt. (for Windows 95/Windows 98)
Or
Accessories-MS-DOS Prompt. (for Windows Me)
Or
Command Prompt. (for Windows NT 4.0)
Or
Accessories-Command Prompt.
(for Windows 2000/Windows XP/Windows Server 2003)

3. At the DOS prompt, type "**D:**" (for example) to select the drive, then press the **Enter** key.

4. Type "**CD ¥PQZZTG*****"**, then press the **Enter** key.

5. Type "**SET RTX_COM=X**", then press the **Enter** key
(**X**: COM port number used for the serial connection on your PC).

6. Type "**READID**", then press the **Enter** key.
- If any error messages appear, change the port number or check the cable connection.
- If any value appear, go to next step.

7. Type "**DOSKEY**", then press the **Enter** key.

<Example: correct setting>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PQZZTG*****
D: ¥PQZZTG***** >SET RTX_COM=X
D: ¥PQZZTG*****>READID
00 52 4F A8 A8
D: ¥PQZZTG*****>DOSKEY
D: ¥PQZZTG*****>
```

<Example: incorrect setting>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PQZZTG*****
D: ¥PQZZTG***** >SET RTX_COM=X
D: ¥PQZZTG*****>READID
   CreateFile error
ERROR 10: Can't open serial port
D: ¥PQZZTG*****>
```

Note:
- "*****" varies depending on the country.

11.4.2.3. Commands

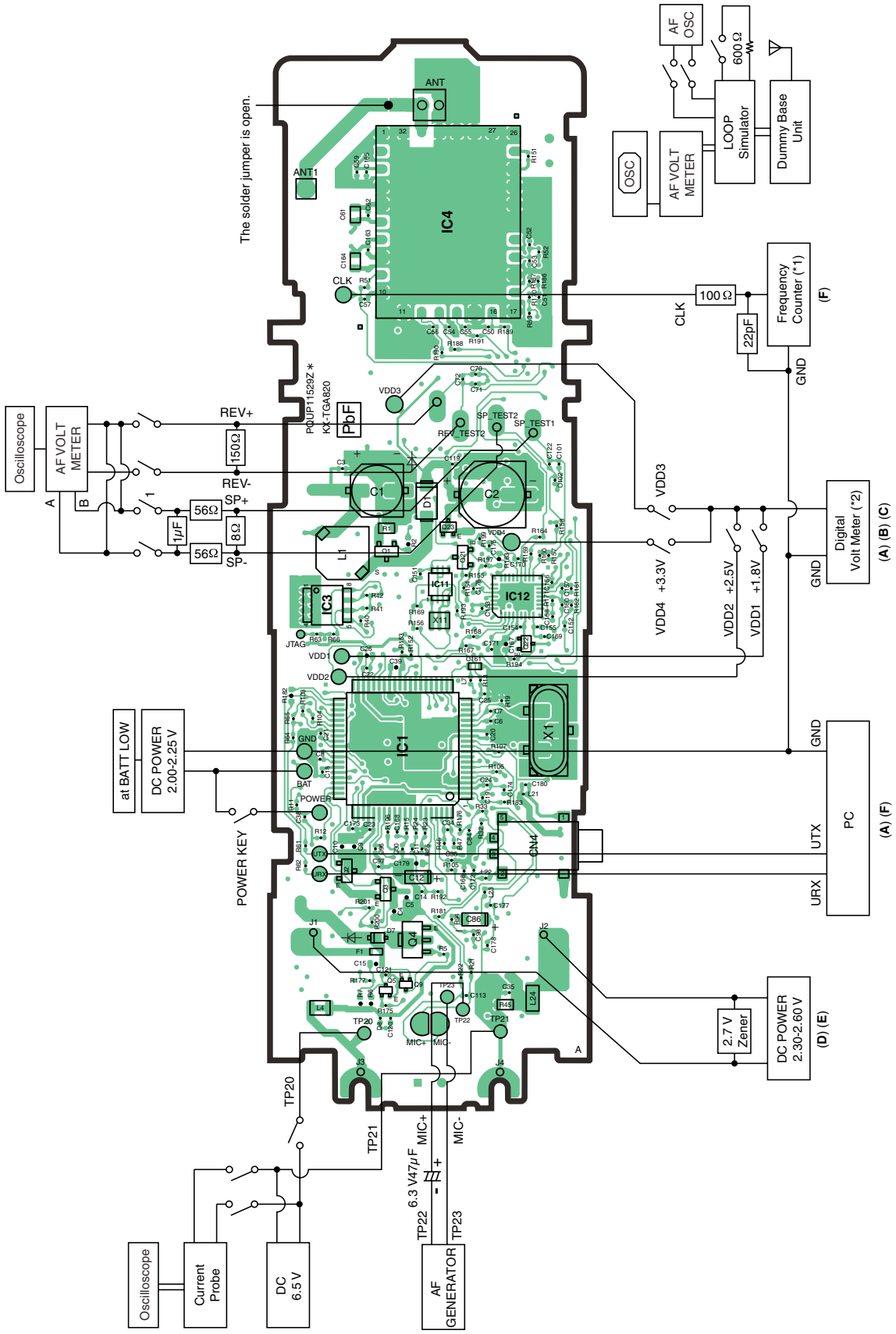
See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of EEPROM	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
setfreq	Adjust Frequency of RFIC	Type "setfreq nn".
getchk	Read checksum	Type "getchk".
wreeprom	Write the data of EEPROM	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.
bursttx	Burst TX mode	Type "bursttx"
testrx	Test RX mode	Type "testrx"
tph	High TX power	Type "tph"
tpl	Low TX power	Type "tpl"

11.5. Adjustment Standard (Handset)

When connecting the simulator equipment for checking, please refer to below.

11.5.1. Component View



Note:

(**A**) - (**F**) is referred to **Check Point (Handset)** (P.48)

(*1) is referred to No.3 of **Check Table for RF part** (P.44)

(*2) is referred to No.4, 5 of **Check Table for RF part** (P.44)

11.6. Things to Do after Replacing IC or X'tal

Cautions:

Some of the content on this page may not apply to models from some countries. The contents below are the minimum adjustments required for operation.

11.6.1. Base Unit

Before making the following adjustment, ensure you have carried out **PC Setting** (P.58) in **The Setting Method of JIG (Base Unit)**.

Items		Necessary Adjustment
BBIC (IC7)	Programs for Voice processing, interface for RF and EEPROM	1. Clock adjustment: Refer to Check Point (D). (*1)
EEPROM (IC5)	Adjustment parameter data (country version batch file, default batch file, etc.)	
X'tal (X1)	System clock	

Note:

(*1) Refer to **Check Point (Base Unit)** (P.48)

11.6.2. Handset

Before making the following adjustment, ensure you have carried out **PC Setting** (P.62) in **The Setting Method of JIG (Handset)**.

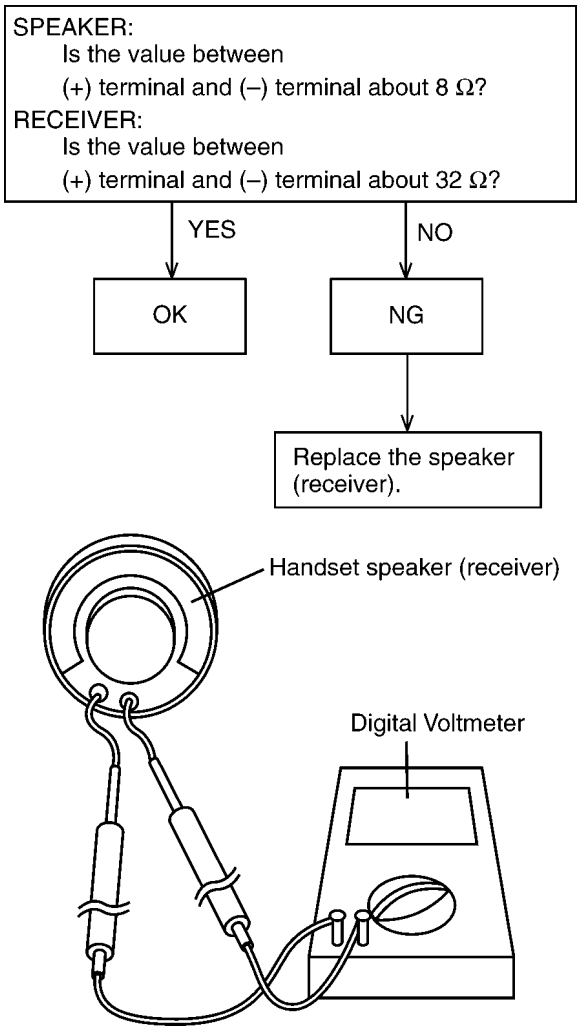
Items		Necessary Adjustment
BBIC (IC1)	Programs for Voice processing, interface for RF and EEPROM	1. Clock adjustment: Refer to Check Point (F). (*2) 2. 1.8 V setting and battery low detection: Refer to Check Point (A), (B) and (C). (*2)
EEPROM (IC3)	Adjustment parameter data (country version batch file, default batch file, etc.)	
X'tal (X1)	System clock	

Note:

(*2) Refer to **Check Point (Handset)** (P.48)

11.7. How to Check the Handset Speaker or Receiver

1. Prepare the digital voltmeter, and set the selector knob to ohm meter.
2. Put the probes at the speaker terminals as shown below.



11.8. Frequency Table (MHz)

	BASE UNIT		HANDSET	
Channel No	**Transmit Frequency**	Receive Frequency	**Transmit Frequency**	**Receive Frequency**
0	1928.448	1928.448	1928.448	1928.448
1	1926.720	1926.720	1926.720	1926.720
2	1924.992	1924.992	1924.992	1924.992
3	1923.264	1923.264	1923.264	1923.264
4	1921.536	1921.536	1921.536	1921.536

Note:

Channel No. 2: In the Test Mode on Base Unit and Handset.

12 Schematic Diagram

12.1. For Schematic Diagram

12.1.1. Base Unit (Schematic Diagram (Base Unit_Main))

Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

2. The schematic diagrams may be modified at any time with the development of new technology.

12.1.2. Handset (Schematic Diagram (Handset))

Notes:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagram may be modified at any time with the development of new technology.

12.1.3. Charger Unit (Schematic Diagram (Charger Unit))

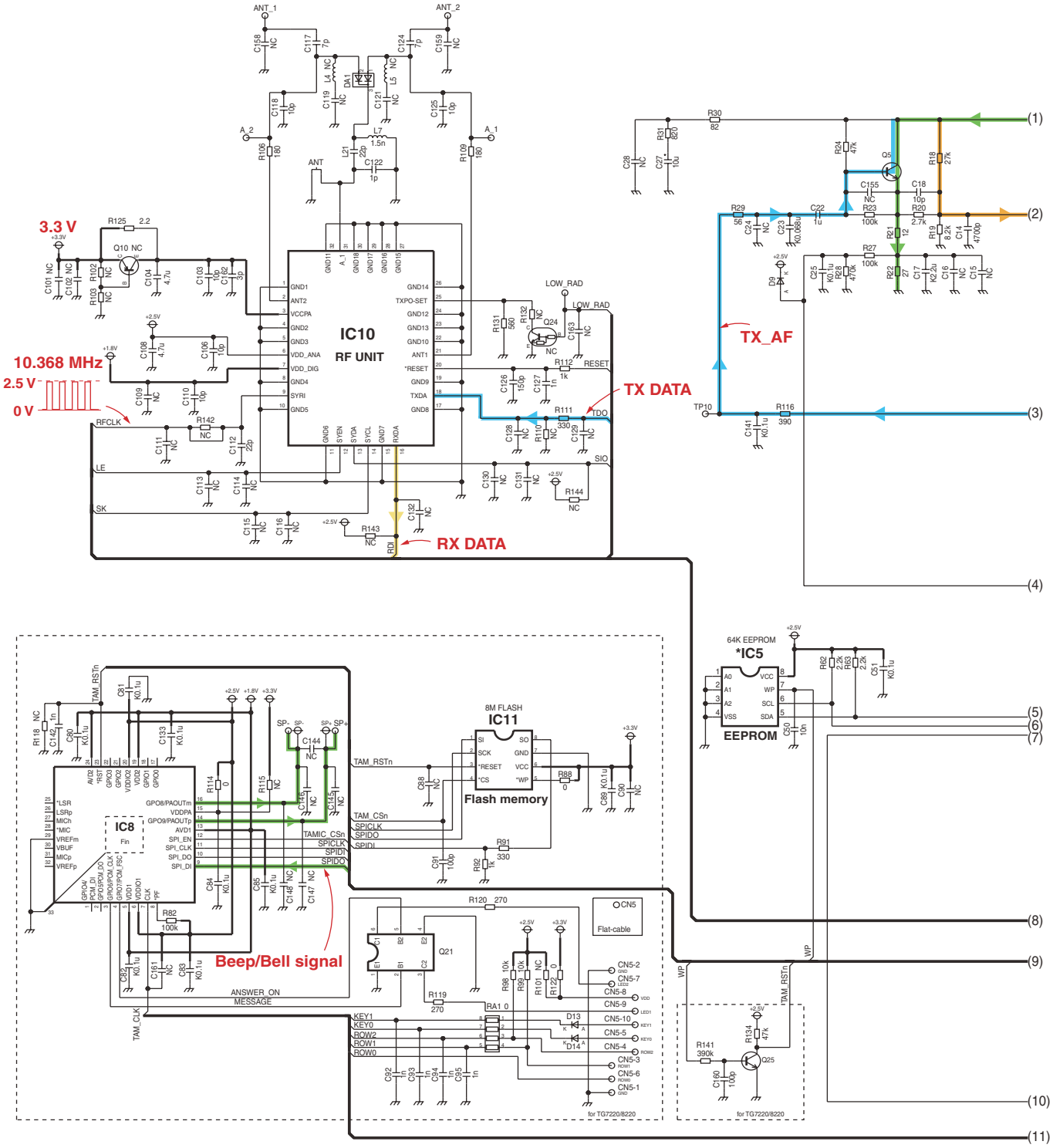
Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

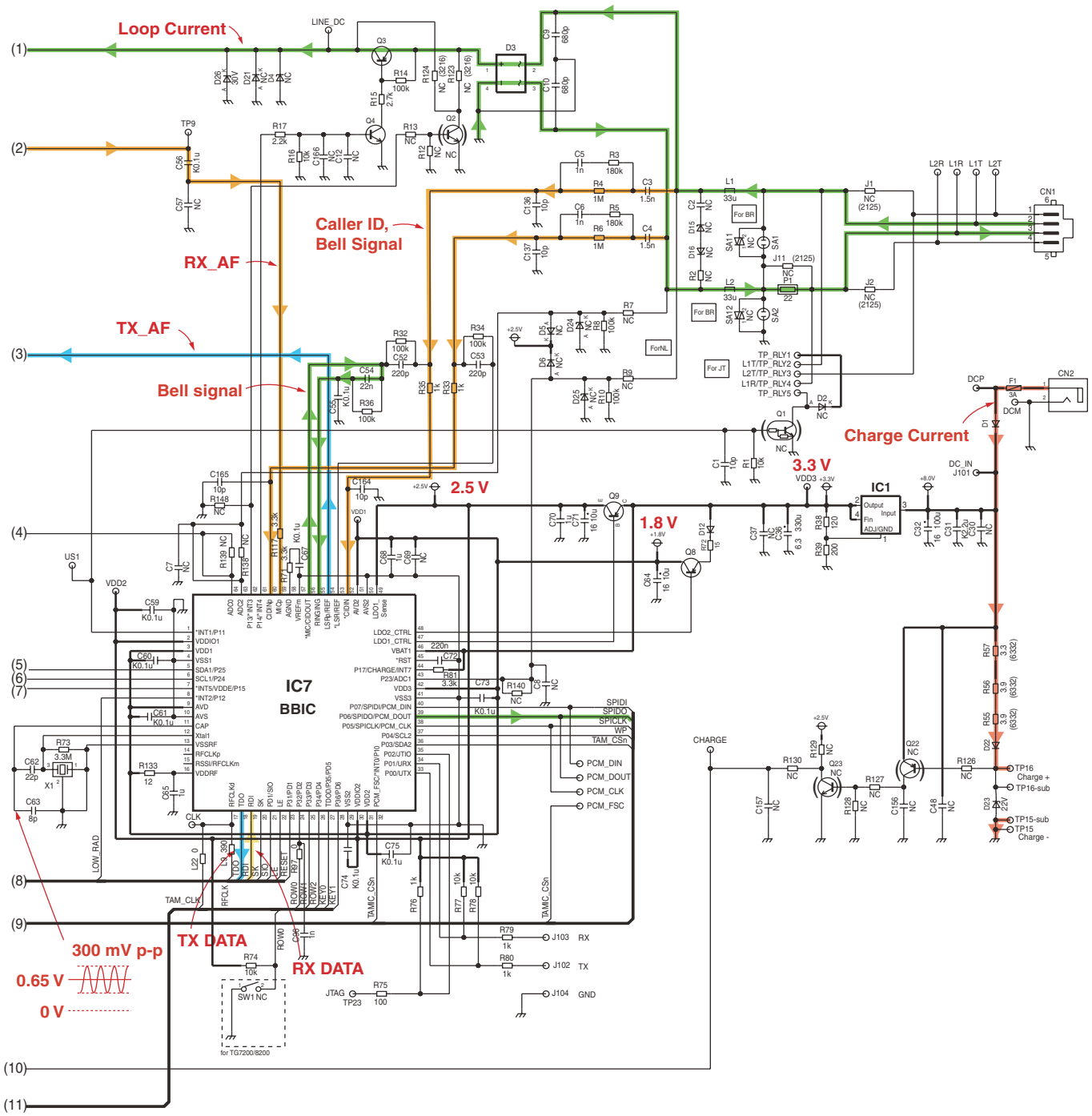
> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

2. The schematic diagram may be modified at any time with the development of new technology.

12.2. Schematic Diagram (Base Unit_Main)



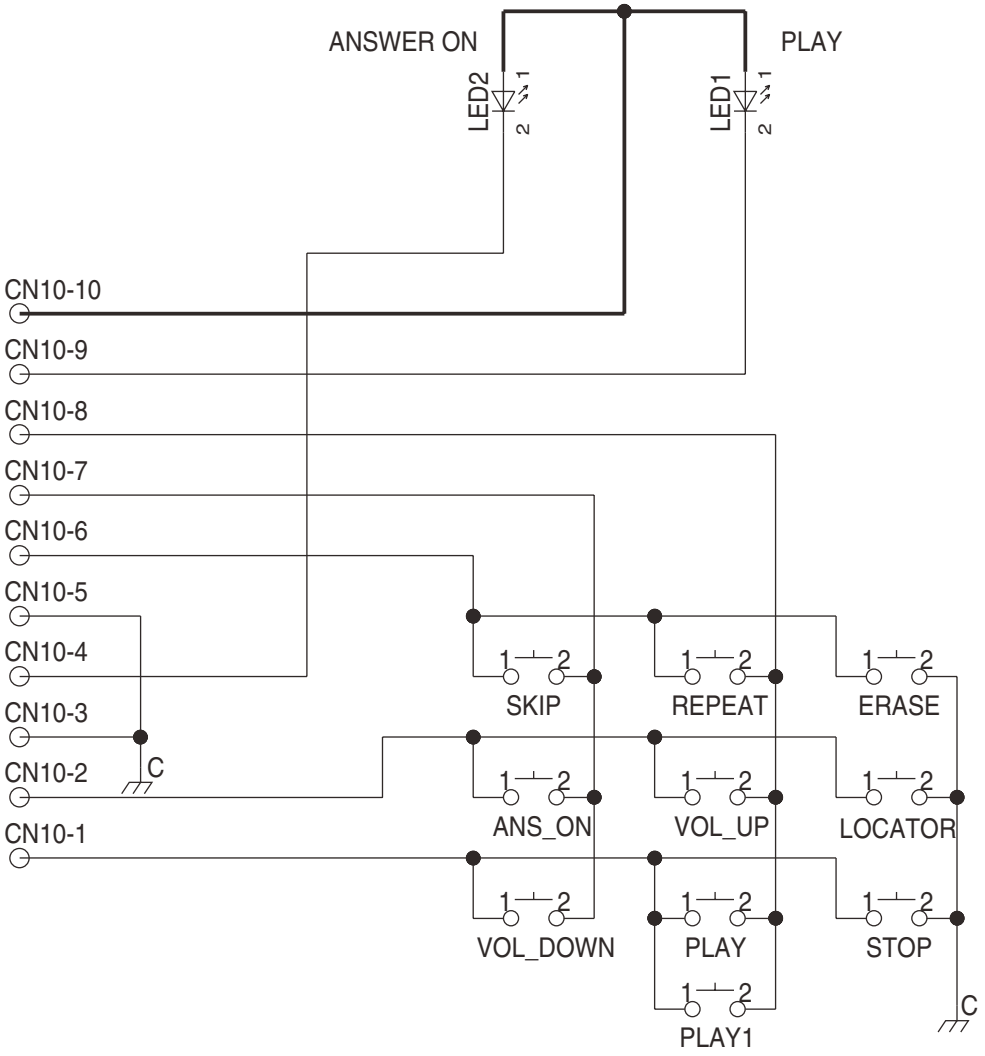
NC: No Components



NC: No Components

KX-TG8231/8232B SCHEMATIC DIAGRAM (Base Unit_Main)

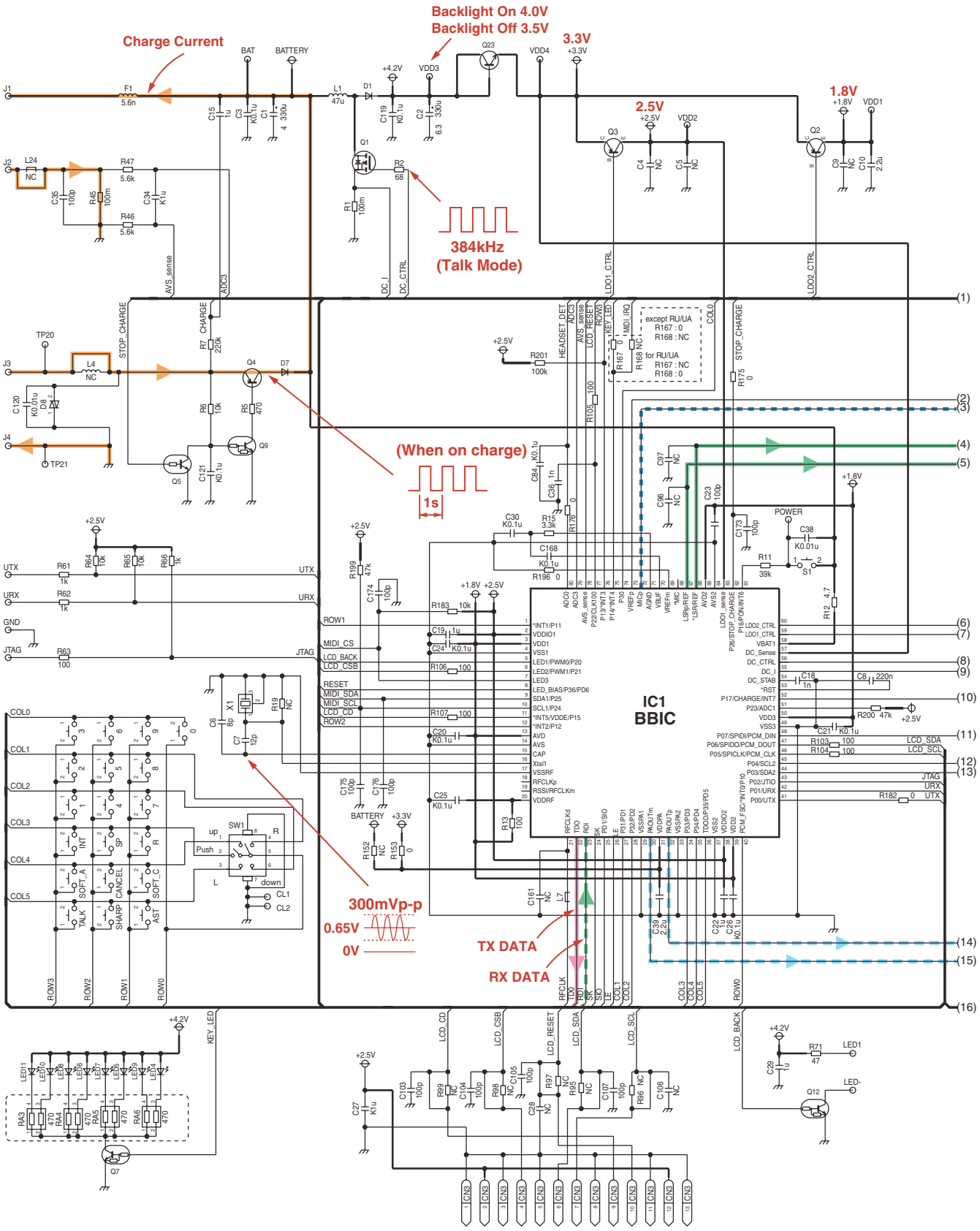
12.3. Schematic Diagram (Base Unit_Operation)



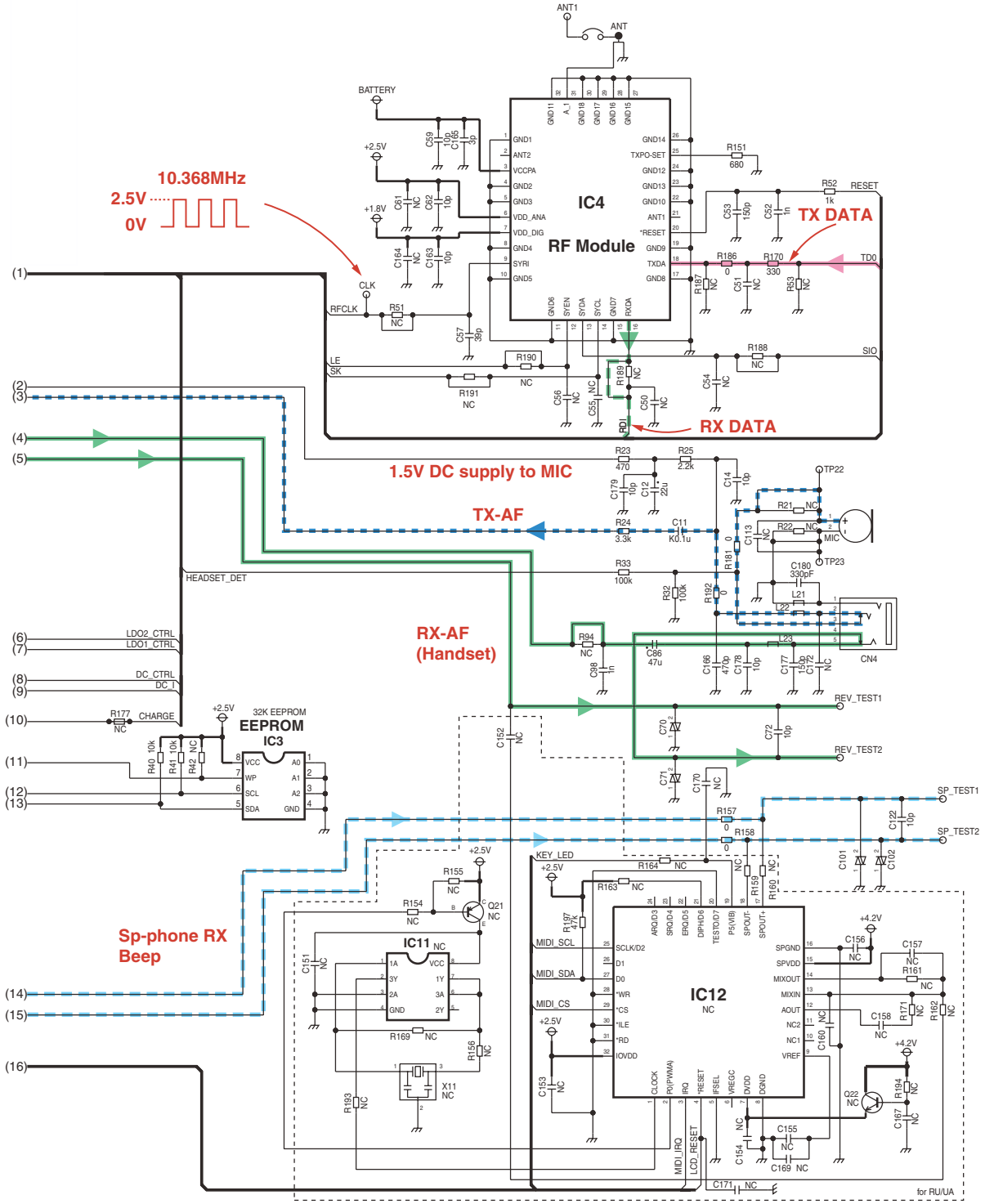
KX-TG8231/8232 SCHEMATIC DIAGRAM (Base Unit_Operation)

Memo

12.4. Schematic Diagram (Handset)



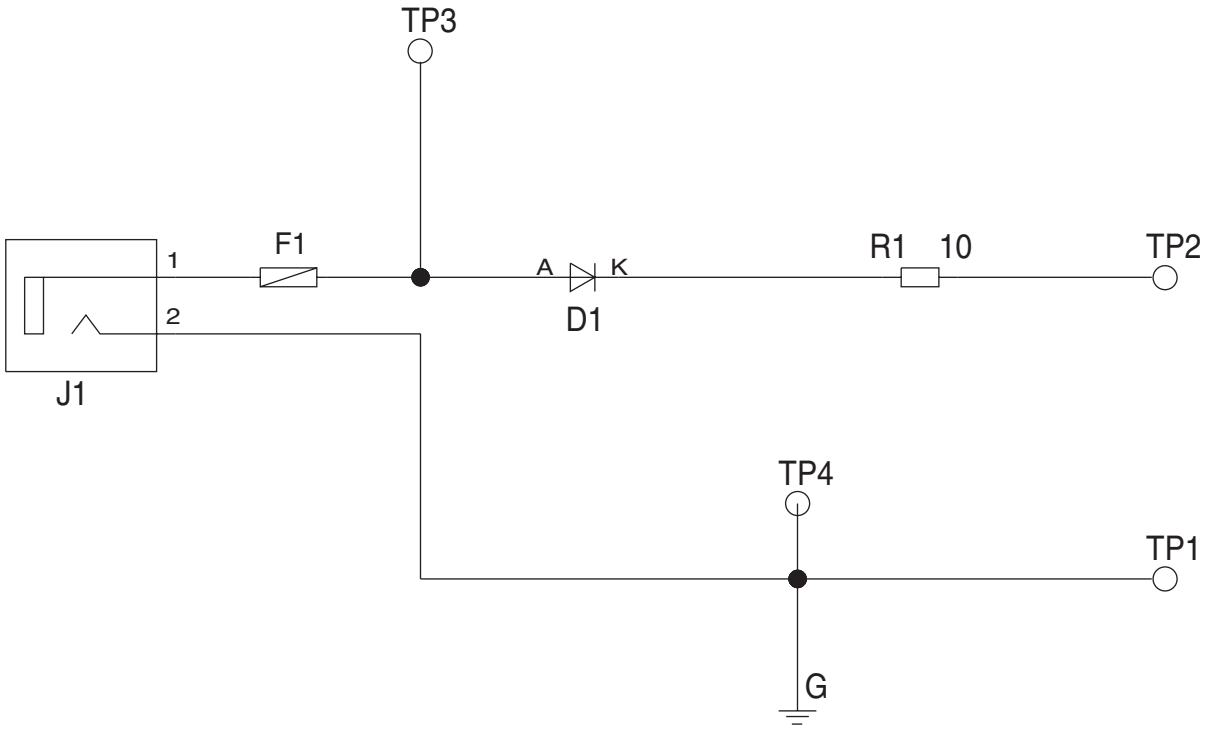
NC: No Components



NC: No Components

KX-TGA820 SCHEMATIC DIAGRAM (Handset)

12.5. Schematic Diagram (Charger Unit)

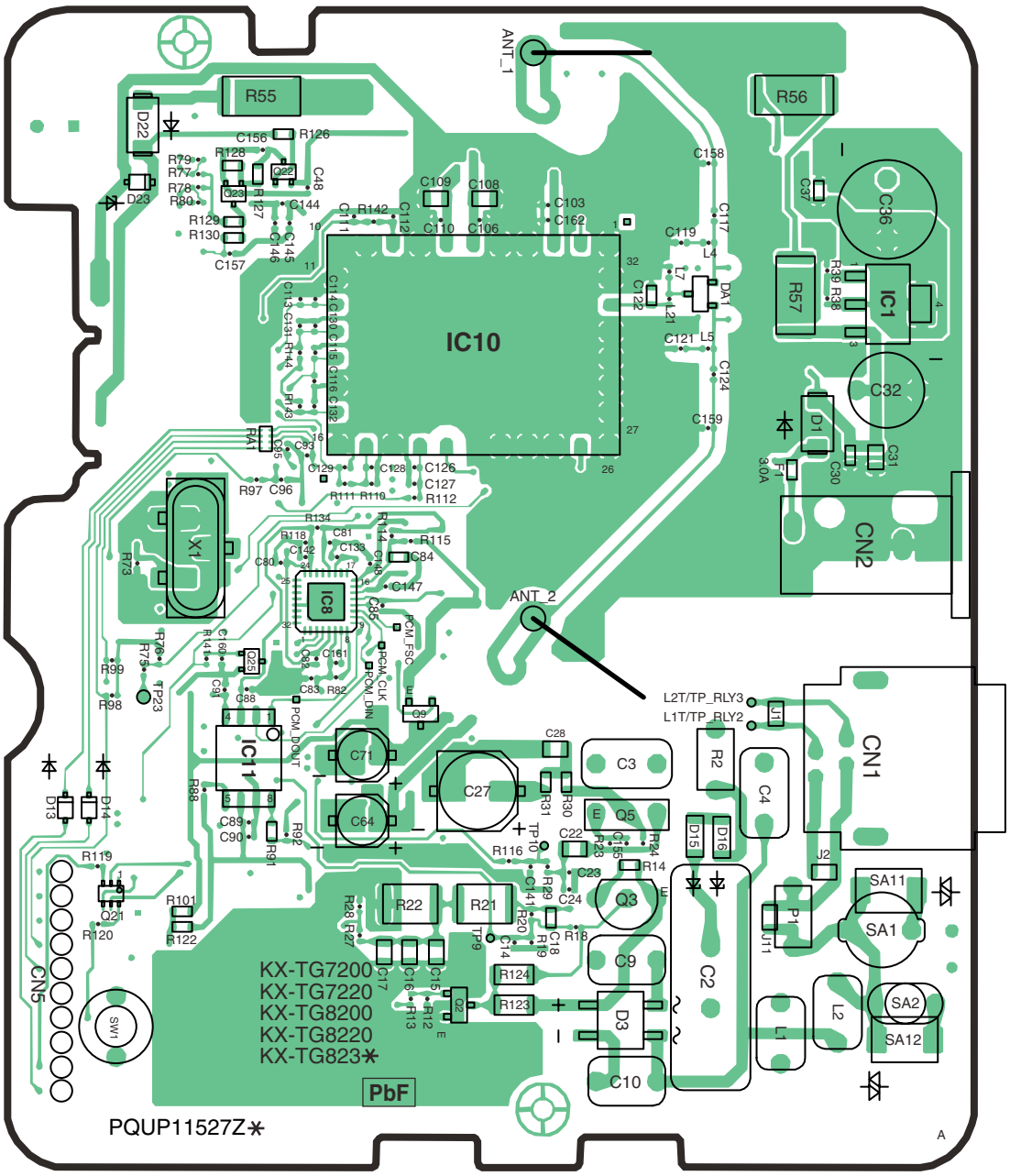


SCHEMATIC DIAGRAM (Charger Unit)

13 Printed Circuit Board

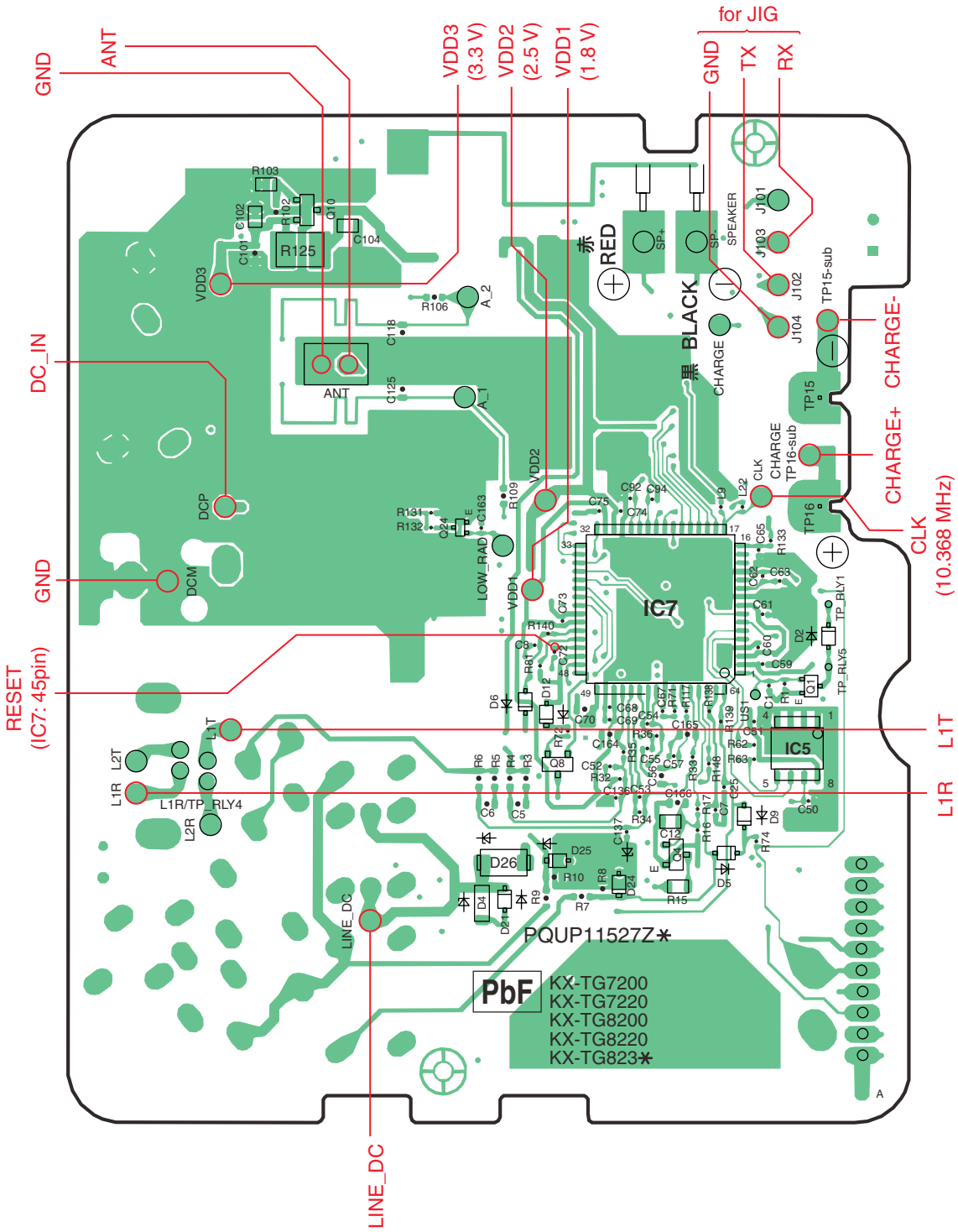
13.1. Circuit Board (Base Unit_Main)

13.1.1. Component View



KX-TG8231/8232 CIRCUIT BOARD (Base Unit (Component View))

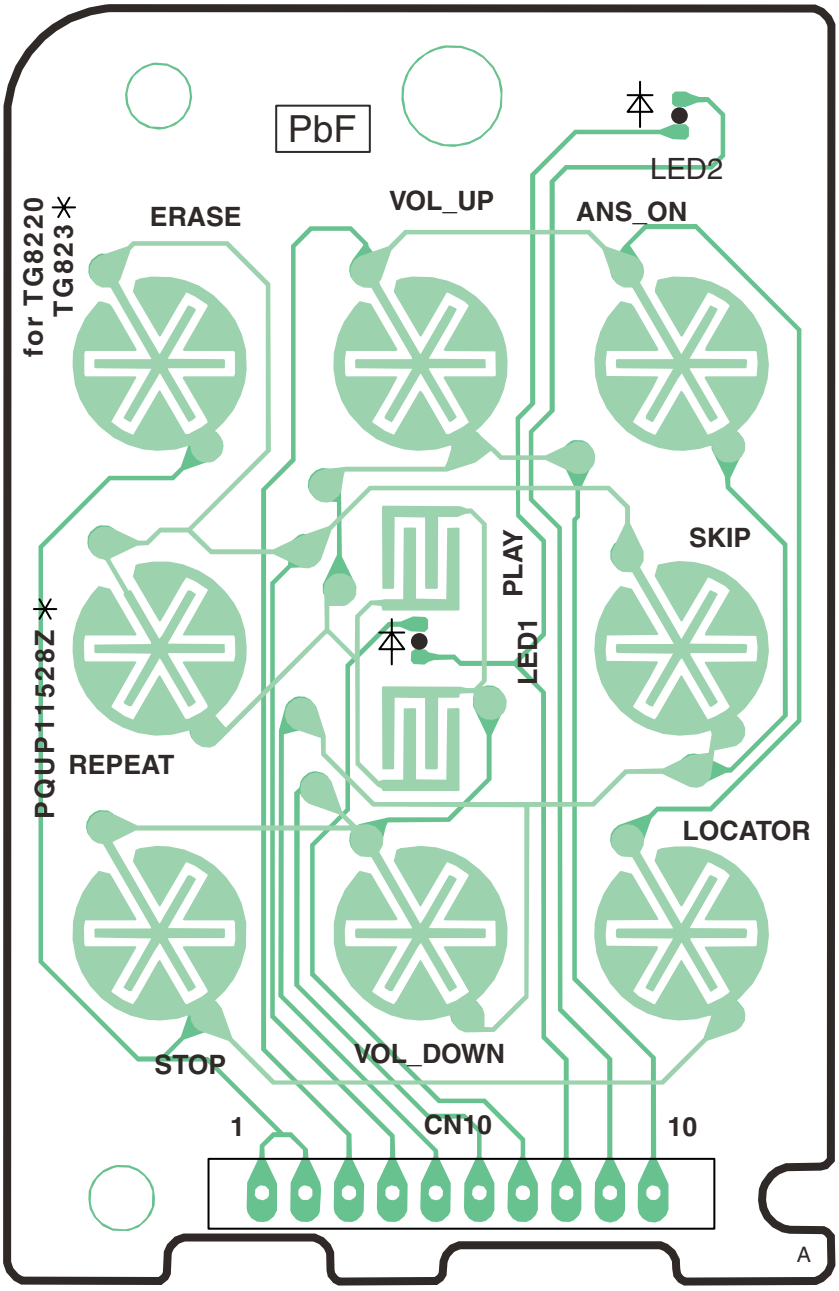
13.1.2. Flow Solder Side View



KX-TG8231/8232 CIRCUIT BOARD (Base Unit (Flow Solder Side View))

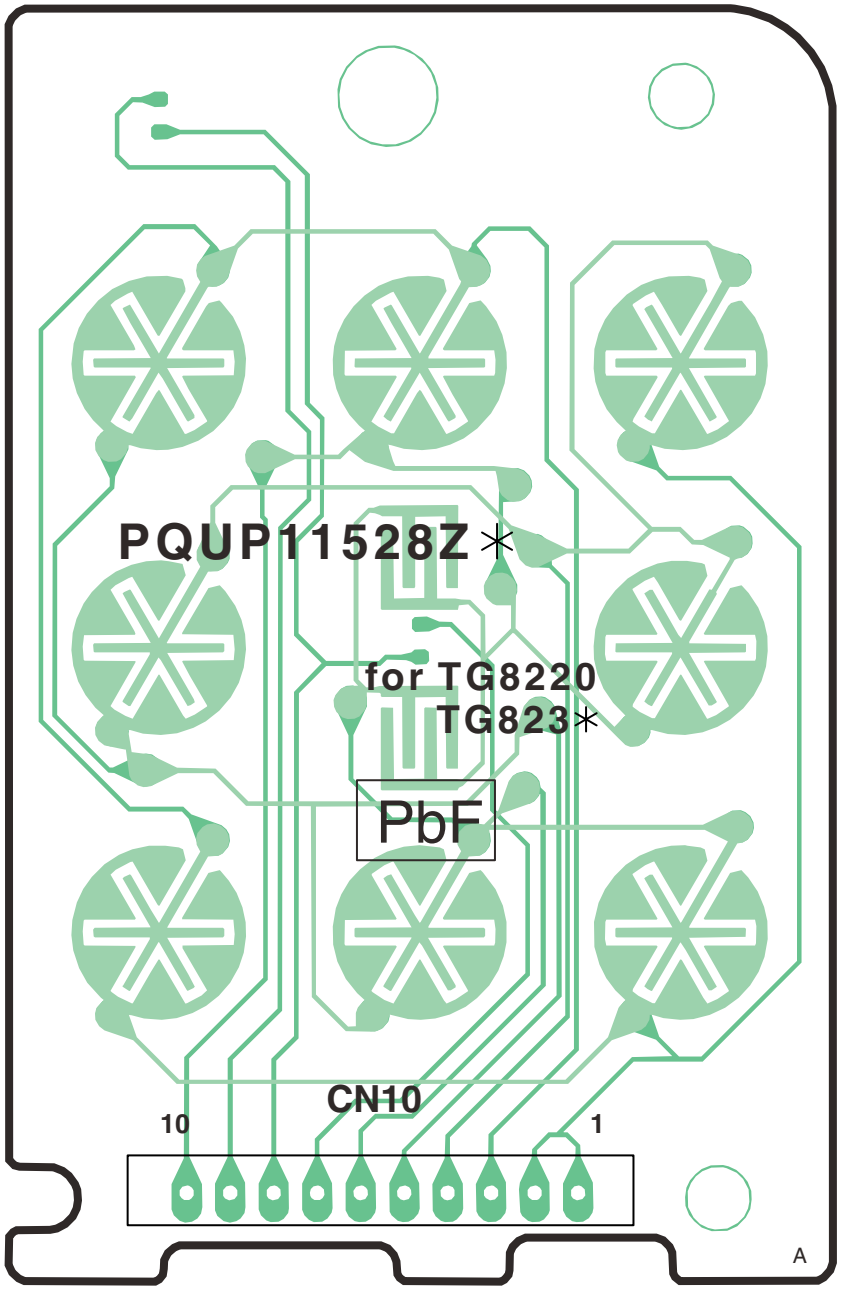
13.2. Circuit Board (Base Unit_Operation)

13.2.1. Component View



KX-TG8231/8232 CIRCUIT BOARD (Base Unit_Operation (Component View))

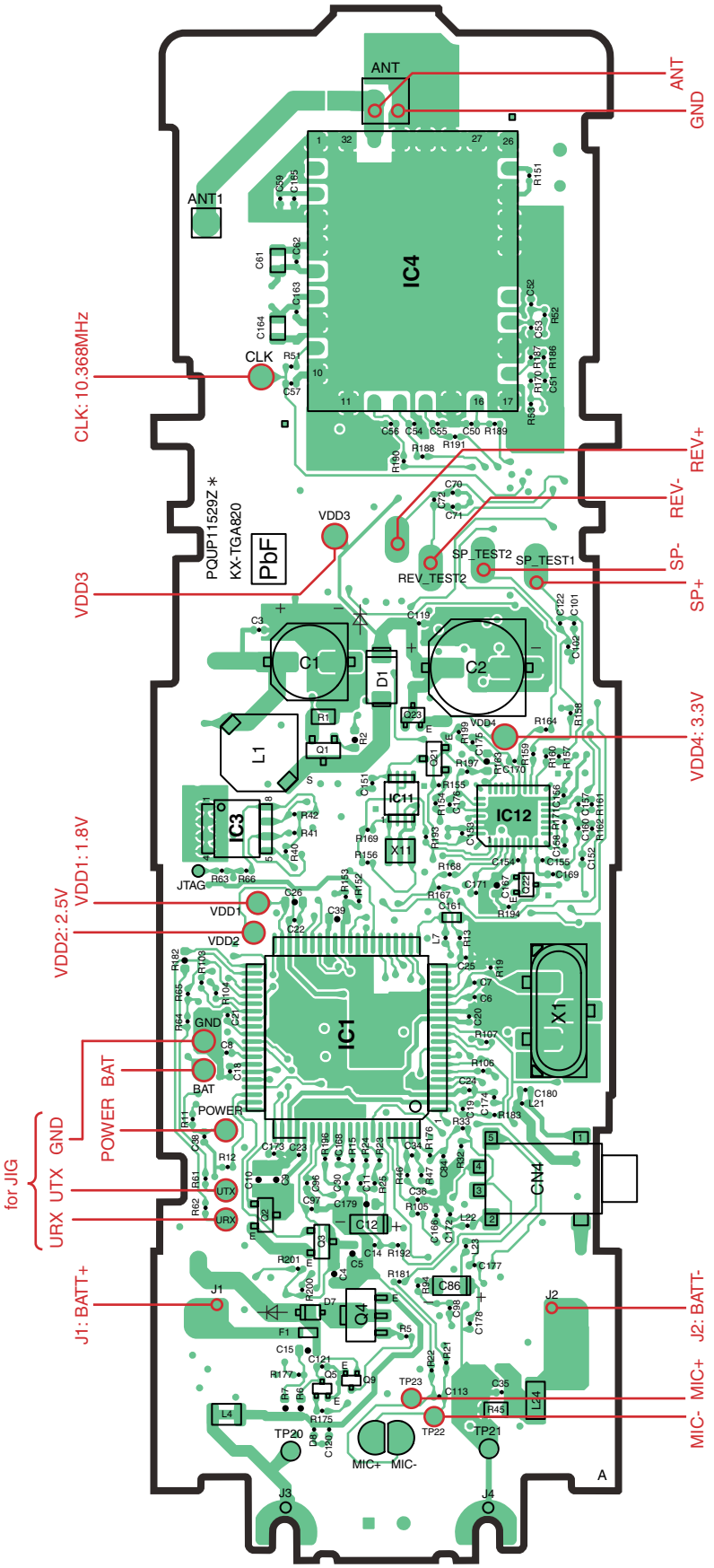
13.2.2. Flow Solder Side View



KX-TG8231/8232 CIRCUIT BOARD (Base Unit_Operation (Flow Solder Side View))

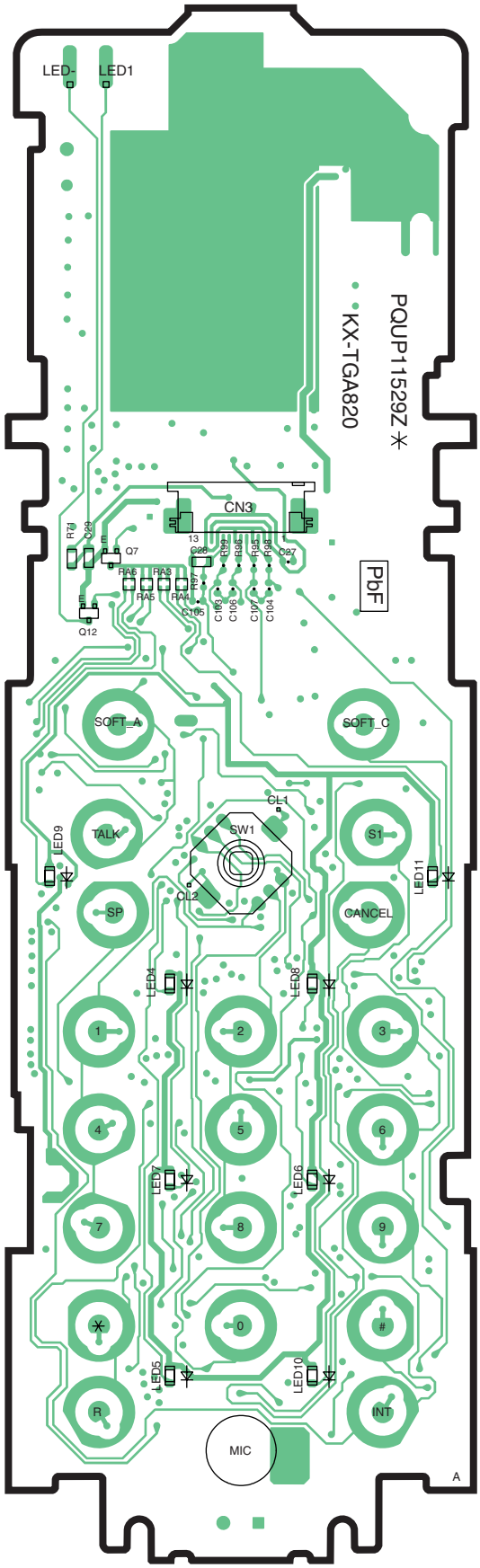
13.3. Circuit Board (Handset)

13.3.1. Component View



KX-TGA820 CIRCUIT BOARD (Handset (Component View))

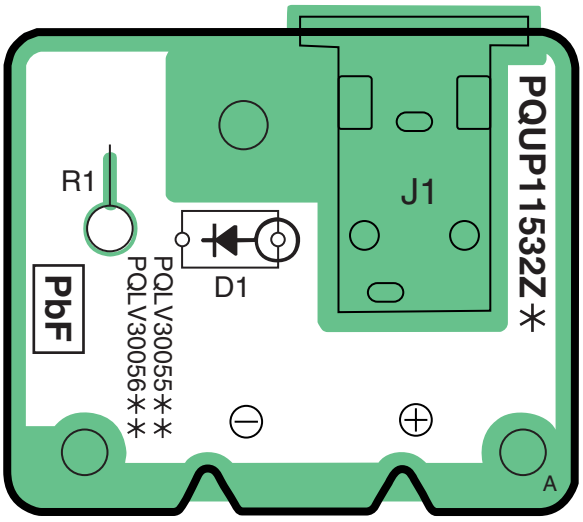
13.3.2. Flow Solder Side View



KX-TGA820 CIRCUIT BOARD (Handset (Flow Solder Side View))

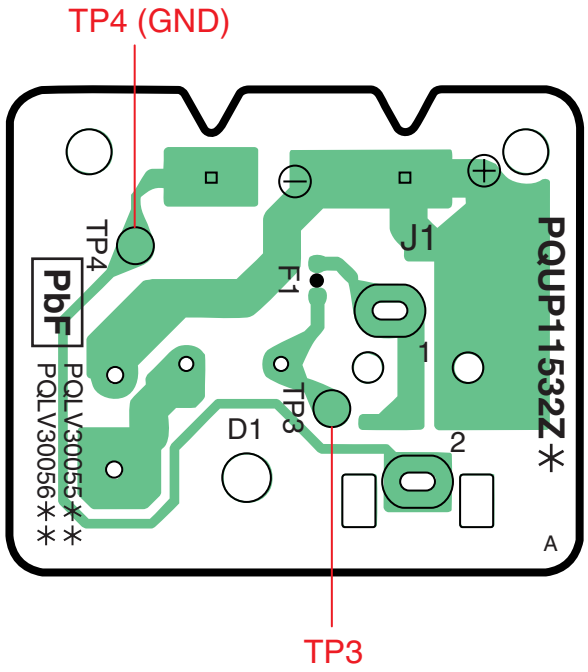
13.4. Circuit Board (Charger Unit)

13.4.1. Component View



CIRCUIT BOARD (Charger Unit (Component View))

13.4.2. Flow Solder Side View



CIRCUIT BOARD (Charger Unit (Flow Solder Side View))

14 Appendix Information of Schematic Diagram

14.1. CPU Data (Base Unit)

14.1.1. IC7 (BBIC)

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
1	*INT1/P11	D.O	RLY	O	I-PU
2	VDDIO1	-	-	-	-
3	VDD1	-	-	-	-
4	VSS1	-	-	-	-
5	SDA1/P25	D.I/O	SDA1	I/O	I
6	SCL1/P24	D.O	SCL1	O	I
7	*INT5/VDDE/P15	D.I	Open	I	O-H
8	*INT2/P12	D.O	Low_rad	O	I-PU
9	AVD	-	-	-	-
10	AVS	-	-	-	-
11	CAP	A.I	CAP	I	I
12	Xtal1	A.I	Xtal1	I	-
13	VSSRF	-	-	-	-
14	RFCLKp	A.O	RFCLKp	O	Hi-Z
15	RSSI/RFCLKm	A.I	NC	I	Hi-Z
16	VDDRF	-	-	-	-
17	RFCLKd	D.O	RFCLKd	O	O-L
18	TDO	A.O	TDO	O	O
19	RDI	D.I	RDI	I	I
20	SK	D.O	SK	O	O-L
21	PD1/SIO	D.I/O	SIO	I/O	I-PD
22	LE	D.O	LE	O	O-L
23	P31/PD1	D.O	RESET(RF)	O	I-PD
24	P32/PD2	D.I	ROW0	I	I-PD
25	P33/PD3	D.I	ROW1	I	I-PD
26	P34/PD4	D.I	ROW2	I	I-PD
27	TDOD/P35/PD5	D.O	KEY0	O	I-PD
28	P36/PD6	D.O	KEY1	O	I-PD
29	VSS2	-	-	-	-
30	VDDIO2	-	-	-	-
31	VDD2	-	-	-	-
32	PCM_FSC/*INT0/P10	D.O	TAMIC_CSn	O	I-PU
33	P00/UTX	D.O	UTX	O	I-PU
34	P01/URX	D.I	URX	I	I-PU
35	P02/JTIO	D.I/O	JTAG	I/O	I-PU
36	P03/SDA2	D.O	TAM_CSn	O	I-PU
37	P04/SCL2	D.O	WP	O	I-PU
38	P05/SPICLK/PCM_CLK	D.O	SPICLK	O	I-PU
39	P06/SPIDO/PCM_DOUT	D.O	SPIDO	O	I-PU
40	P07/SPIDI/PCM_DIN	D.I	SPIDI	I	I-PU
41	VSS3	-	-	-	-
42	VDD3	-	-	-	-
43	P23/ADC1	A.I	NC	I	I
44	P17/CHARGE/INT7	D.I	INT7	I	I-PD
45	*RST	D.O	RST	O	I-PU
46	VBAT1	A.I	VBAT1	I	I
47	LDO1_CTRL	A.I	LDO1_CTRL	I	I
48	LDO2_CTRL	A.I	LDO2_CTRL	I	I
49	LDO1_Sense	A.I	LDO1_Sense	I	I
50	AVS2	-	-	-	-
51	AVD2	-	-	-	-
52	*CIDIN	A.I	CIDINn	I	I
53	*LSR/REF	A.O	LSRn	O	O
54	LSRp/REF	A.O	LSRp	O	O
55	RINGING	A.I	RINGING	I	I
56	*MIC/CIDOUT	A.O	CIDOUT	O	I
57	VREFm	-	-	-	-
58	AGND	A.O	AGND	O	O
59	MICp	A.I	MICp	I	I

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
60	CIDINp	A.I	CIDINp	I	I
61	P14/*INT4	D.O	HOOK	O	I
62	P13/*INT3	D.O	NC	O	I
63	ADC2	A.I	NC	I	I
64	ADC0	A.I	ADC0	I	I

14.2. CPU Data (Handset)

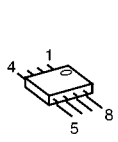
14.2.1. IC1 (BBIC)

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
1	*INT1/P11	D.I	ROW1	I	I-PU
2	VDDIO1	-	VDDIO1	-	-
3	VDD1	-	VDD1	-	-
4	VSS1	-	VSS1	-	-
5	LED1/PWM0/P20	D.O	NC	O	I-PU
6	LED2/PWM1/P21	D.O	LCD_CSB	O	I-PU
7	LED3	A.I	NC	I	I
8	LED_BIAS/P36/PD6	D.O	RESET(RF)	O	I-PD
9	SDA1/P25	D.I/O	NC	O	I
10	SCL1/P24	D.O	NC	O	I
11	*INT5/VDDE/P15	D.O	LCD_CD	O	O-H
12	*INT2/P12	D.I	ROW2	I	I-PU
13	AVD	-	AVD	-	-
14	AVS	-	AVS	-	-
15	CAP	A.I	CAP	I	I
16	Xtal1	A.I	Xtal1	I	I
17	VSSRF	-	VSSRF	-	-
18	RFCLKp	A.O	NC	O	Hi-Z
19	RSSI/RFCLKm	A.I	NC	I	Hi-Z
20	VDDRF	-	VDDRF	-	-
21	RFCLKd	D.O	RFCLKd	O	O-L
22	TDO	A.O	TDO	O	O
23	RDI	D.I	RDI	I	I
24	SK	D.O	SK	O	O-L
25	PD1/SIO	D.I/O	SIO	I/O	I-PD
26	LE	D.O	LE	O	O-L
27	P31/PD1	D.O	COL1	O	I-PD
28	P32/PD2	D.O	COL2	O	I-PD
29	VSSPA1	-	VSSPA1	-	-
30	PAOUTm	A.O	PAOUTm	O	O
31	VDDPA	-	VDDPA	-	-
32	PAOUTp	A.O	PAOUTp	O	O
33	VSSPA2	-	VSSPA2	-	-
34	P33/PD3	D.O	COL3	O	I-PD
35	P34/PD4	D.O	COL4	O	I-PD
36	TDOD/P35/PD5	D.O	COL5	O	I-PD
37	VSS2	-	VSS2	-	-
38	VDDIO2	-	VDDIO2	-	-
39	VDD2	-	VDD2	-	-
40	PCM_FSC/*INT0/P10	D.I	ROW0	I	I-PU
41	P00/UTX	D.O	UTX	O	I-PU
42	P01/URX	D.I	URX	I	I-PU
43	P02/JTIO	D.I/O	JTAG	I/O	I-PU
44	P03/SDA2	D.I/O	SDA2	I/O	I-PU
45	P04/SCL2	D.O	SCL2	O	I-PU
46	P05/SPICLK/PCM_CLK	D.O	LCD_SCL	O	I-PU
47	P06/SPIDO/PCM_DOUT	D.I/O	LCD_SDA	I/O	I-PU
48	P07/SPIDI/PCM_DIN	D.O	RESET(RF)	O	I-PU
49	VSS3	-	VSS3	-	-
50	VDD3	-	VDD3	-	-
51	P23/ADC1	A.I	NC	I	I
52	P17/CHARGE/INT7	D.I	CHARGE	I	I-PD
53	*RST	D.O	nRST	O	I-PU
54	DC_STAB	A.O	DC_STAB	O	O
55	DC_I	A.I	DC_I	I	I
56	DC_CTRL	A.O	DC_CTRL	O	O-PD
57	DC_Sense	A.I	DC_Sense	I	I
58	VBAT1	A.I	VBAT1	I	I
59	LDO1_CTRL	A.I	LDO1_CTRL	I	I
60	LDO2_CTRL	A.I	LDO2_CTRL	I	I
61	P16/PON/INT6	D.I	PON	I	I-PD
62	P26/STOP_CHARGE	A.O	STOP_CHARGE	O	O-L

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
63	LDO1_Sense	A.I	LDO1_Sense	I	I
64	AVS2	-	AVS2	-	-
65	AVD2	-	AVD2	-	-
66	*LSR/REF	A.O	LSRn	O	O
67	LSRp/REF	A.O	LSRp	O	O
68	*MIC	A.I	MICn	I	I
69	VREFm	-	VREFm	-	-
70	VBUF	A.O	NC	O	O
71	AGND	A.O	AGND	O	O
72	MICp	A.I	MICp	I	I
73	VREFp	A.O	VREFp	O	O
74	P30	D.O	COL0	O	I-PD
75	P14/*INT4	D.O	KEY_LED	O	I
76	P13/*INT3	D.I	ROW3	I	I
77	P22/CLK100	D.O	LCD_RESET	O	I-PD
78	AVS_sense	A.I	AVS_sense	I	I
79	ADC3	A.I	ADC3	I	I
80	ADC0	A.I	ADC0	I	I

14.3. Terminal Guide of the ICs, Transistors and Diodes

14.3.1. Base Unit



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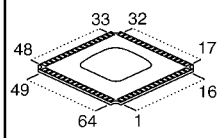

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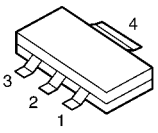

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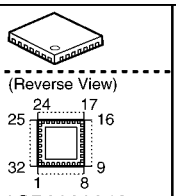

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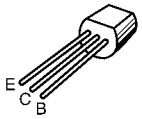

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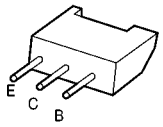

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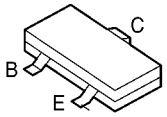

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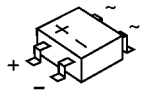
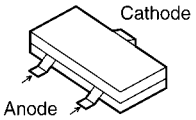


B0EDER000009



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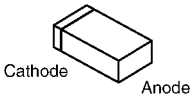

MA112 , MA1Z300
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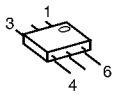
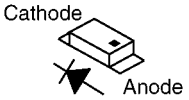
B0ECKM000008, MA8220

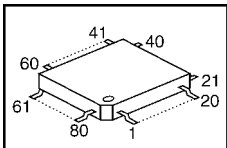


XP0421300L



PQVDBR1111C

14.3.2. Handset



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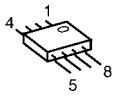

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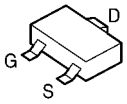
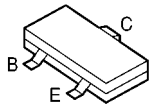
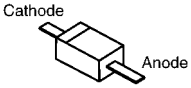


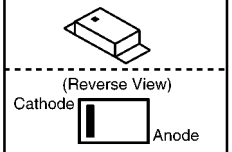
PQVTFDN335N



UN9219J, B1ADGE000004
UNR9216J0L, 2SD1819A-TX



MA2Z72000
B0JCME000035



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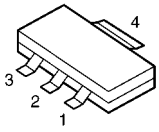
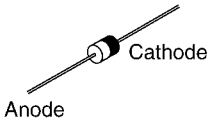


2SB766ARTX

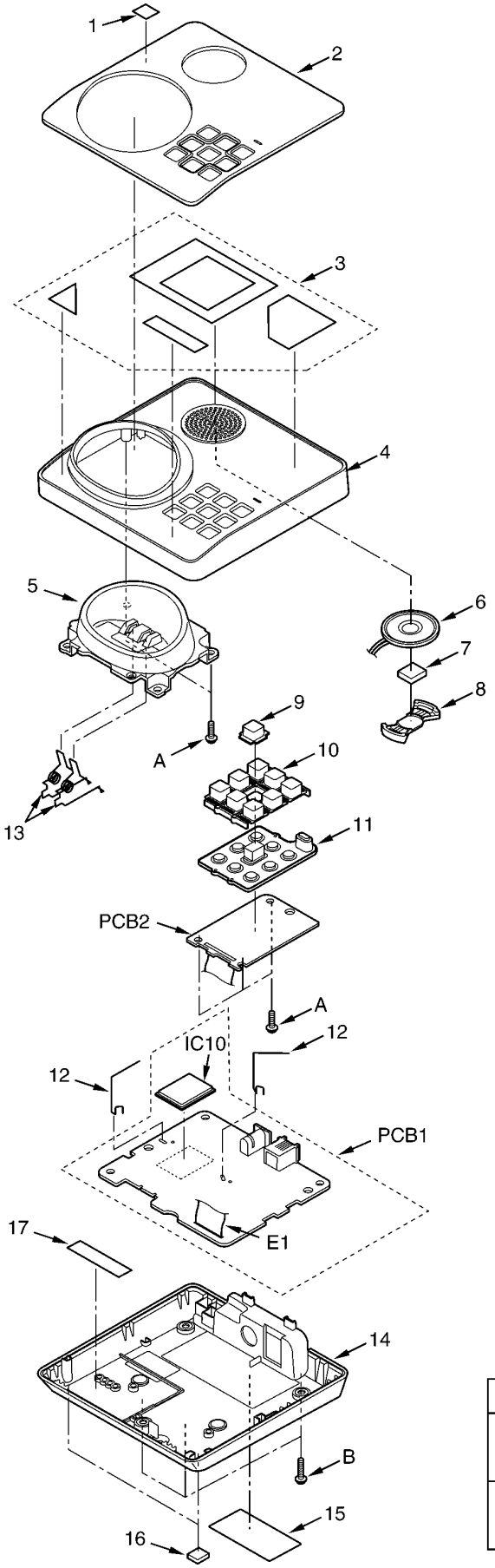
14.3.3. Charger Unit



B0JAME000095

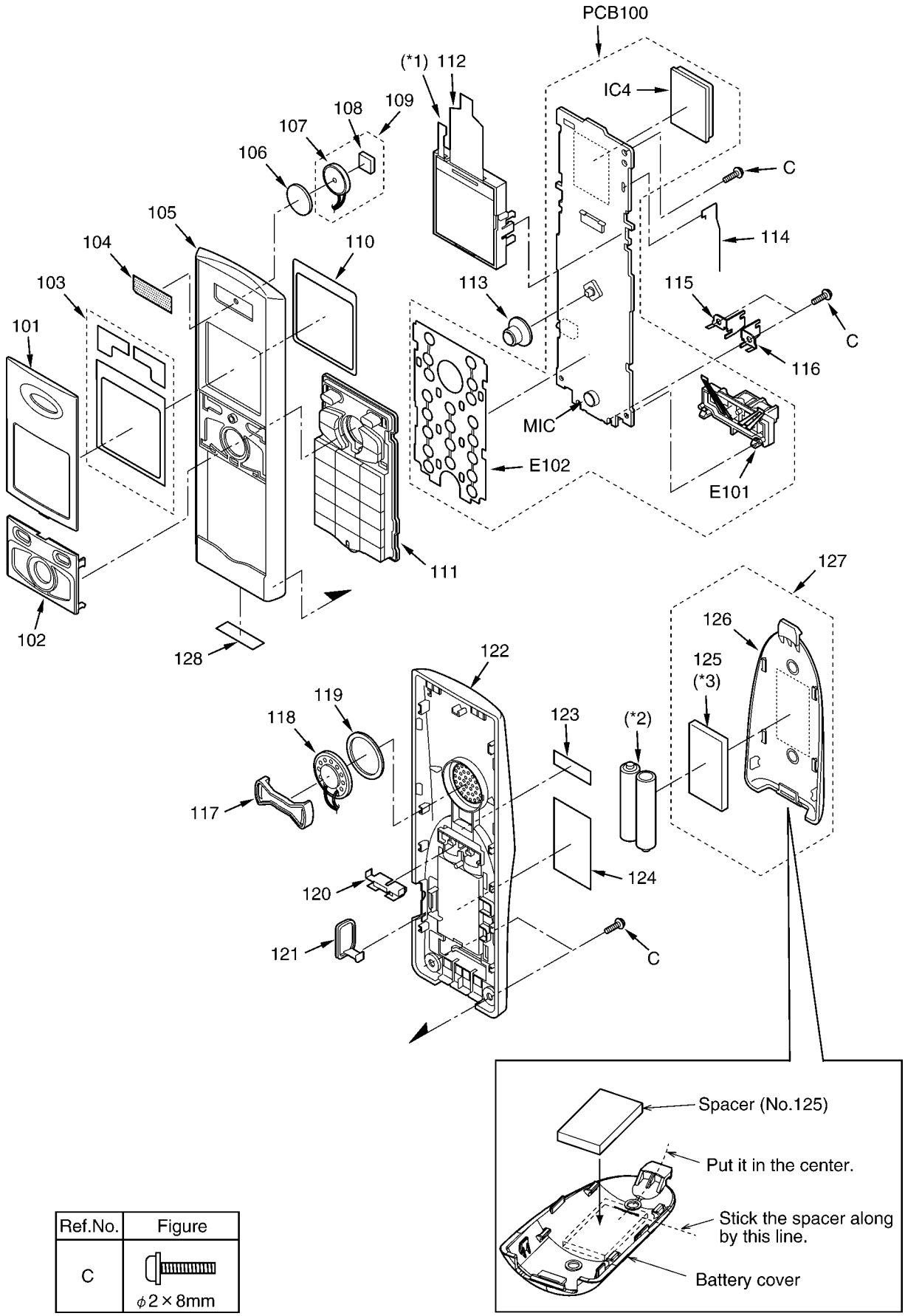
15 Exploded View and Replacement Parts List

15.1. Cabinet and Electrical Parts (Base Unit)



Ref.No.	Figure
A	ϕ2.6 × 8 mm
B	ϕ2.6 × 12 mm

15.2. Cabinet and Electrical Parts (Handset)



Ref.No.	Figure
C	ϕ2×8mm

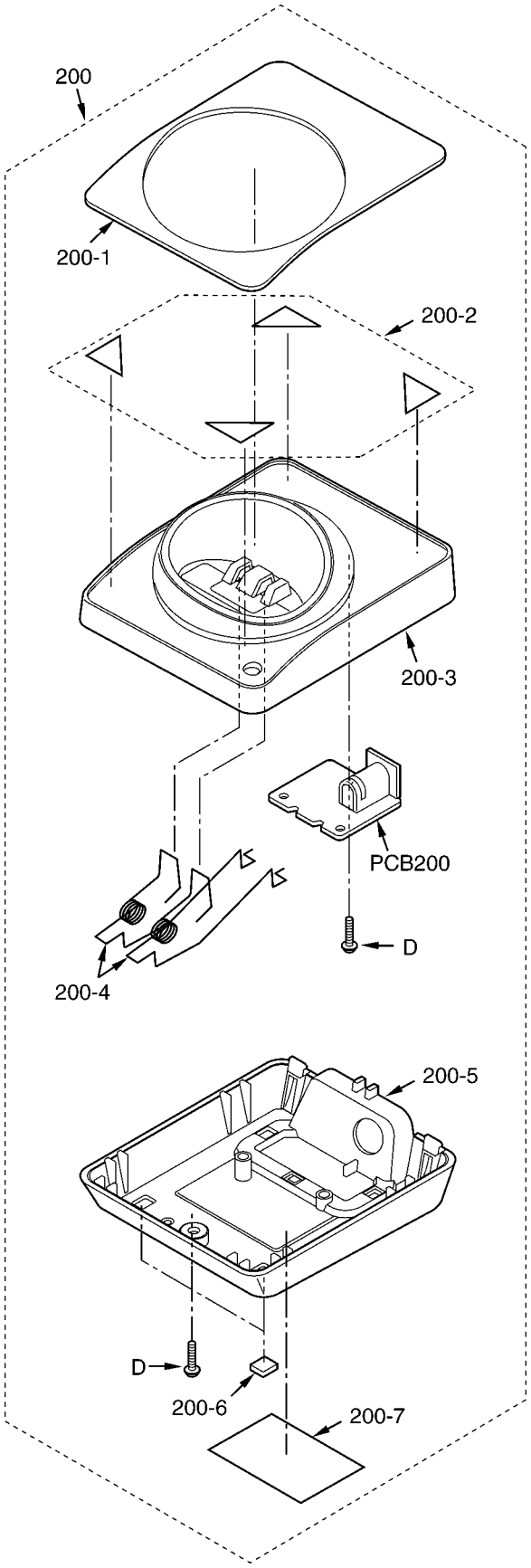
Note:

(*1) This cable is fixed by soldering. Refer to **Fix the LCD to the Main P.C.Board (Handset)** (P.57).

(*2) The rechargeable Ni-MH battery HHR-4DPA (Capacity: up to 550 mAh) is available through sales route of Panasonic.

(*3) Attach the spacer (No. 125) to the exact location described above.

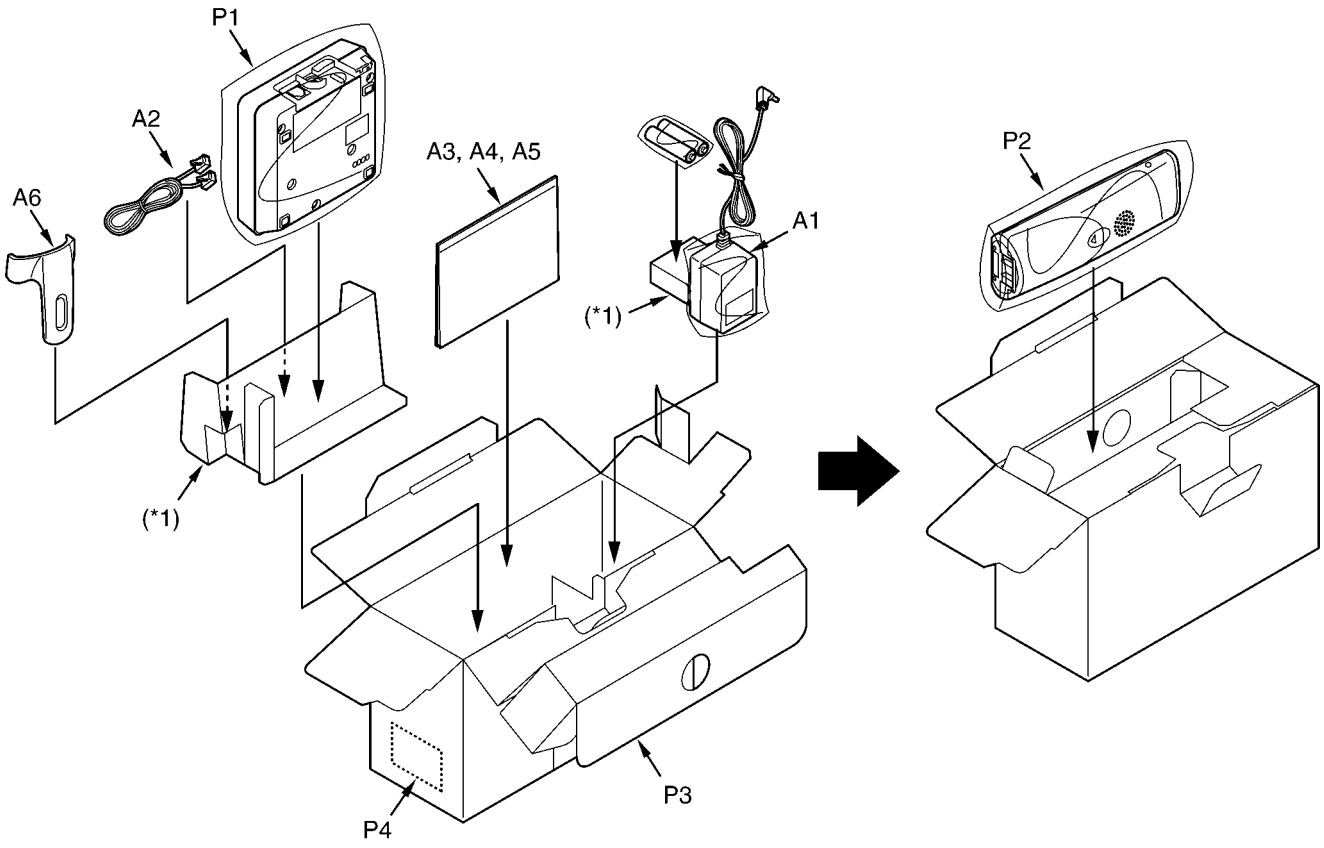
15.3. Cabinet and Electrical Parts (Charger Unit)



Ref.No.	Figure
D	ϕ2 × 10mm

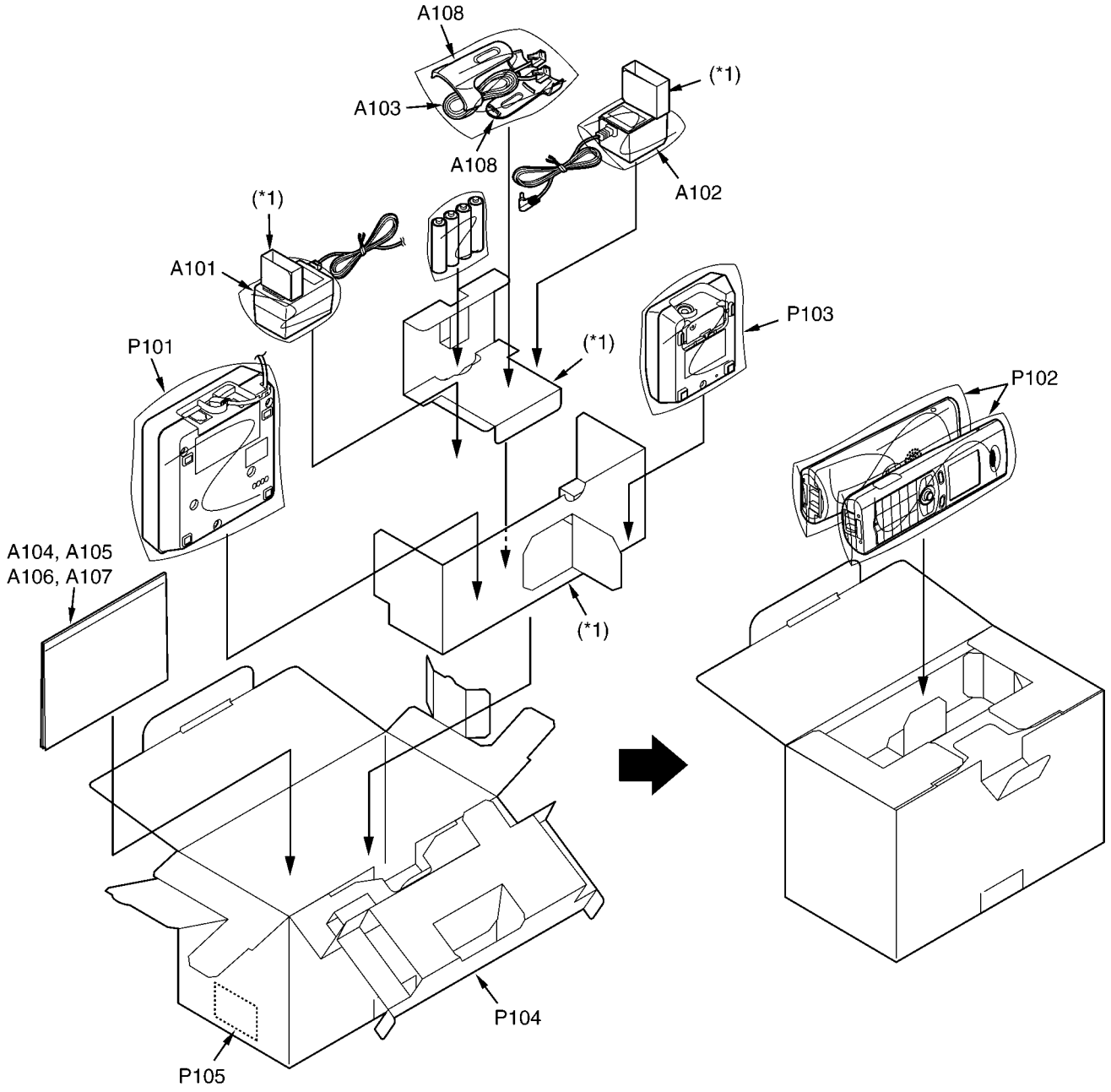
15.4. Accessories and Packing Materials

15.4.1. KX-TG8231B



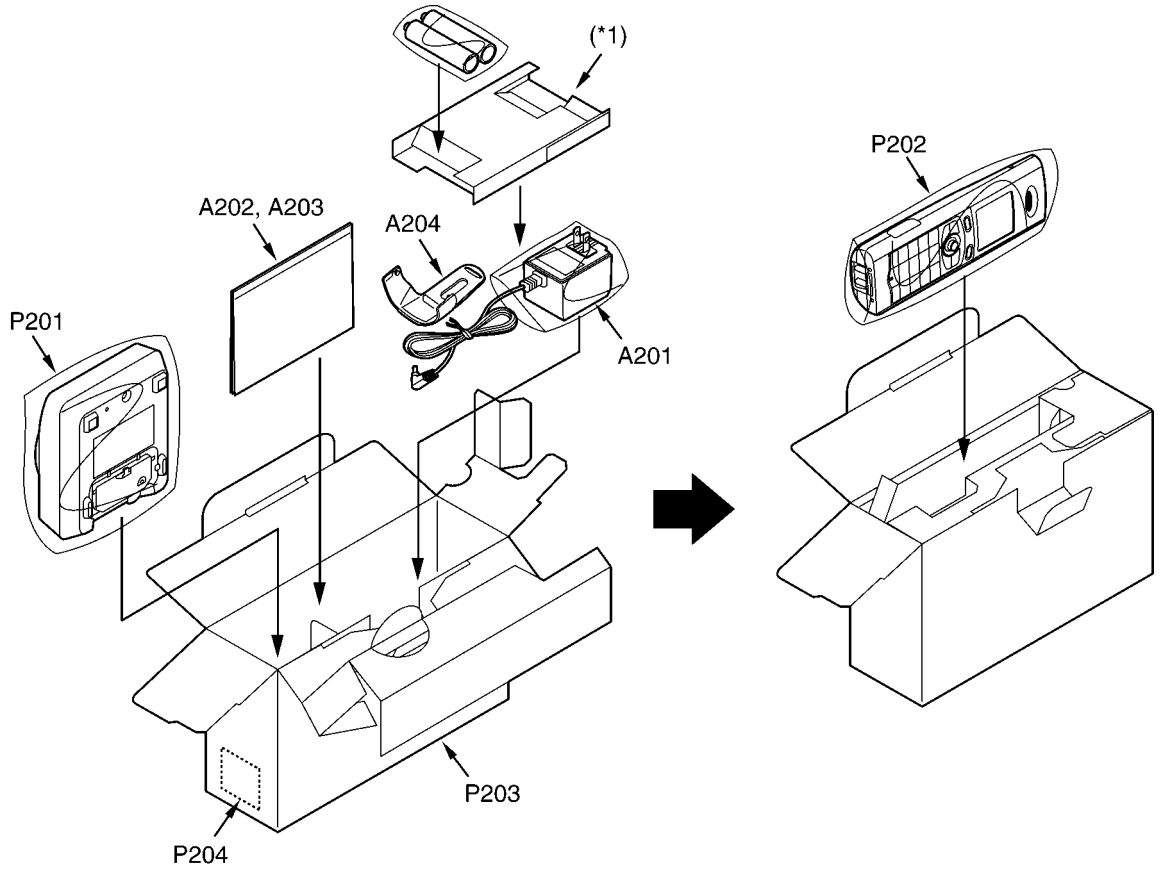
Note:
(*1) These pads are pieces of Ref No. P3 (GIFT BOX).

15.4.2. KX-TG8232B



Note:
(*1) These pads are pieces of Ref No. P104 (GIFT BOX).

15.4.3. KX-TGA820B



Note:
(*1) This pad is a piece of Ref No. P203 (GIFT BOX).

15.5. Replacement Part List

1. RTL (Retention Time Limited)

   Note:

   The marking (RTL) indicates that the Retention Time is limited for this item.

   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice

   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.

3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.

4. ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.

5. RESISTORS & CAPACITORS

   Unless otherwise specified;

   All resistors are in ohms (Ω) K=1000Ω, M=1000kΩ

   All capacitors are in MICRO FARADS (μF)P=μμF

   *Type & Wattage of Resistor

Type

ERC:Solid ERDS:Carbon ERJ:Chip	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Chip ERS:Fusible Resistor ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage Of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol ECUV,PQCUV,ECUE:Chip ECQMS:Mica	ECCD,ECKD,ECBT,F1K,ECUV:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECST,EEE:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :16V 2A :100V

15.5.1. Base Unit

15.5.1.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQQT23193Z	LABEL, CHARGE	
2	PQGP10328Y1	PANEL	AS-HB
3	PQHS10783Z	TAPE, DOUBLE SIDED	
4	PQKM10766Z1	CABINET BODY	ABS-HB
5	PQKE10479Z1	CASE, CHARGE TERMINAL	PS-HB
6	L0AA02A00072	SPEAKER	
7	PQHG10729Z	RUBBER PARTS, CUSHION	
8	PQHR11313Z	GUIDE, SPEAKER	ABS-HB
9	PQBC10507Z1	BUTTON, MESSAGE	AS-HB
10	PQBX10400Z1	BUTTON, FUNCTION	ABS-HB
11	PQSX10350Z	KEYBOARD SWITCH	
12	PQSA10208Z	ANTENNA	
13	PQJT10256Z	CHARGE TERMINAL	
14	PQKF10747Y1	CABINET COVER	PS-HB
15	PQGT19901Z	NAME PLATE	
16	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
17	PQXDZLDRS1	MAGNET ELECTRIC TRANSDUCER, SECURITY TAG	

15.5.1.2. Main P.C.Board Parts

Note:

(*1) When replacing IC5, IC7, IC11 or X1, make the adjustment using PQZZTG8231M. Refer to **Base Unit** (P.65) of **Things to Do after Replacing IC or X'tal**.

(*2) When replacing IC8, refer to **How to Replace the LLP (Leadless Leadframe Package) IC** (P.51)

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP1TG8231H	MAIN P.C. BOARD ASS'Y (RTL)	
		(ICs)	
IC1	C0CBAYG00009	IC	S
IC5	PQWI1TG8231H	IC (EEPROM) (*1)	
IC7	PQLP10316Z	IC (BBIC (COB)) (*1)	
IC8	C1CB00002427	IC (*2)	
IC11	PQWI3TG1032H	IC (FLASH MEMORY) (*1)	
		(TRANSISTORS)	
Q3	B1ACGP000007	TRANSISTOR(SI)	
Q4	PQVTBF822T7	TRANSISTOR(SI)	
Q5	2SD1994A	TRANSISTOR(SI)	
Q8	B1ADGE000004	TRANSISTOR(SI)	
Q9	B1ADGE000004	TRANSISTOR(SI)	
Q21	XP0421300L	TRANSISTOR(SI)	
Q25	2SD1819A	TRANSISTOR(SI)	
		(DIODES)	
D1	B0JCME000035	DIODE(SI)	
D3	B0EDER000009	DIODE(SI)	
D9	1SS355	DIODE(SI)	S
D12	MA112	DIODE(SI)	S
D13	1SS355	DIODE(SI)	S
D14	1SS355	DIODE(SI)	S
D22	B0ECKM000008	DIODE(SI)	
D23	MA8220	DIODE(SI)	S
D26	MA1Z300	DIODE(SI)	S
DA1	B0DDCM000001	DIODE(SI)	
		(COILS)	
L1	PQLQXF330K	COIL	S
L2	PQLQXF330K	COIL	S
L7	G1C1N5Z00007	COIL	
		(JACKS)	
CN1	K2LB102B0053	JACK, MODULAR	S
CN2	K2ECYB000001	JACK, DC	S
		(VARISTORS)	
SA1	PQVDDSS301L	VARISTOR(SURGE ABSORBER)	S
SA2	PQVDDSS301L	VARISTOR(SURGE ABSORBER)	S
		(RESISTORS)	
R1	ERJ2GEJ103	10K	
R3	ERJ3GEYJ184	180K	
R4	ERJ3GEYJ105	1M	
R5	ERJ3GEYJ184	180K	
R6	ERJ3GEYJ105	1M	
R8	ERJ3GEYJ104	100K	
R10	ERJ3GEYJ104	100K	
R14	ERJ3GEYJ104	100K	
R15	PQ4R10XJ272	2.7K	S
R16	ERJ2GEJ103	10K	
R17	ERJ2GEJ222	2.2K	
R18	ERJ2GEJ273X	27K	
R19	ERJ2GEJ822	8.2K	
R20	ERJ2GEJ272	2.7K	
R21	ERJ12YJ120	12	

Ref. No.	Part No.	Part Name & Description	Remarks
R22	ERJ12YJ270	27	
R23	ERJ2GEJ104	100K	
R24	ERJ2GEJ473	47K	
R27	ERJ2GEJ104	100K	
R28	ERJ2GEYJ474	470K	S
R29	ERJ2GEJ560X	56	
R30	ERJ3GEYJ820	82	
R31	ERJ3GEYJ821	820	
R32	ERJ2GEJ104	100K	
R33	ERJ2GEJ102	1K	
R34	ERJ2GEJ104	100K	
R35	ERJ2GEJ102	1K	
R36	ERJ2GEJ104	100K	
R38	ERJ2RKF1200	120	
R39	ERJ2RKF2000	200	
R55	ERJ1TYJ3R9U	3.9	
R56	ERJ1TYJ3R9U	3.9	
R57	ERJ1TYJ3R3U	3.3	
R62	ERJ2GEJ222	2.2K	
R63	ERJ2GEJ222	2.2K	
R71	ERJ2GEJ332	3.3K	
R72	ERJ2GEJ150	15	
R73	ERJ2GEJ335	3.3M	
R74	ERJ2GEJ103	10K	
R75	ERJ2GEJ101	100	
R76	ERJ2GEJ102	1K	
R77	ERJ2GEJ103	10K	
R78	ERJ2GEJ103	10K	
R79	ERJ2GEJ102	1K	
R80	ERJ2GEJ102	1K	
R81	ERJ2GEJ332	3.3K	
R82	ERJ2GEJ104	100K	
R88	ERJ2GE0R00	0	
R91	ERJ3GEYJ331	330	
R92	ERJ2GEJ102	1K	
R97	ERJ2GE0R00	0	
R98	ERJ2GEJ103	10K	
R99	ERJ2GEJ103	10K	
R106	ERJ3GEYJ181	180	
R109	ERJ3GEYJ181	180	
R111	ERJ2GEJ331	330	
R112	ERJ2GEJ102	1K	
R114	ERJ2GE0R00	0	
R116	ERJ2GEJ391	390	
R117	ERJ2GEJ332	3.3K	
R119	ERJ2GEJ271	270	
R120	ERJ2GEJ271	270	
R122	ERJ3GEY0R00	0	
R125	ERJ12YJ2R2	2.2	
R131	ERJ2GEJ561	560	
R133	ERJ2GEJ120	12	
R134	ERJ2GEJ473	47K	
R141	ERJ2GEJ394	390K	
L9	ERJ2GEJ391	390	
L22	ERJ2GE0R00	0	
		(CAPACITORS)	
C1	ECUE1H100DCQ	10P	
C3	F1B2H152A048	0.0015	
C4	F1B2H152A048	0.0015	
C5	ECUV1H102KBV	0.001	
C6	ECUV1H102KBV	0.001	
C9	F1B2H681A070	680P	
C10	F1B2H681A070	680P	
C14	ECUE1E472KBQ	0.0047	
C17	PQCUV1A225KB	2.2	
C22	PQCUV1A105KB	1	
C23	ECUE1A683KBQ	0.068	
C25	ECUE1A104KBQ	0.1	
C27	F2G1H1000009	10	
C31	PQCUV1A225KB	2.2	
C32	ECEA1CK101	100	S
C36	ECEA0JKA331	330	
C50	ECUE1C103KBQ	0.01	
C51	ECUE1A104KBQ	0.1	
C52	ECUE1H221JCQ	220P	
C53	ECUE1H221JCQ	220P	
C54	ECUE1C223KBQ	0.022	
C55	ECUE1A104KBQ	0.1	
C56	ECUV1C104KBV	0.1	
C59	ECUE1A104KBQ	0.1	
C60	ECUE1A104KBQ	0.1	
C61	ECUE1A104KBQ	0.1	
C62	ECUE1H220JCQ	22P	
C63	ECJ0EC1H080C	8P	S
C64	F2G1C1000014	10	
C65	ECUE0J105KBQ	1	
C67	ECUE1A104KBQ	0.1	
C68	ECUE0J105KBQ	1	
C70	ECUV1A105KBV	1	
C71	F2G1C1000014	10	
C72	ECUE1A224KBQ	0.22	
C73	ECUE1A104KBQ	0.1	
C74	ECUE1A104KBQ	0.1	
C75	ECUE1A104KBQ	0.1	
C80	ECUE1A104KBQ	0.1	
C81	ECUE1A104KBQ	0.1	
C82	ECUE1A104KBQ	0.1	
C83	ECUE1A104KBQ	0.1	
C84	ECUV1C104KBV	0.1	
C85	ECUE1A104KBQ	0.1	
C89	ECUE1A104KBQ	0.1	
C91	ECUE1H101JCQ	100P	
C92	ECUE1H102KBQ	0.001	
C93	ECUE1H102KBQ	0.001	
C94	ECUE1H102KBQ	0.001	
C95	ECUE1H102KBQ	0.001	
C96	ECUE1H102KBQ	0.001	
C103	ECUE1H100DCQ	10P	
C104	PQCUV0J475MB	4.7	
C106	ECUE1H100DCQ	10P	
C108	PQCUV0J475MB	4.7	
C110	ECUE1H100DCQ	10P	
C112	ECUE1H220JCQ	22P	
C117	ECUE1H7R0DCQ	7P	
C118	ECUV1H100DCV	10P	
C122	ECUV1H010CCV	1P	
C124	ECUE1H7R0DCQ	7P	
C125	ECUV1H100DCV	10P	
C126	ECUE1H151JCQ	150P	
C127	ECUE1H102KBQ	0.001	
C133	ECUE1A104KBQ	0.1	
C136	ECUE1H100DCQ	10P	
C137	ECUE1H100DCQ	10P	
C141	ECUE1A104KBQ	0.1	
C142	ECUE1H102KBQ	0.001	
C160	ECUE1H101JCQ	100P	
C162	ECUE1H3R0CCQ	3P	
C164	ECUV1H100DCV	10P	
C165	ECUV1H100DCV	10P	
L21	ECUE1H220JCQ	22P	
		(OTHERS)	
E1	WBX10SH-3.5G	LEAD WIRE, PARALLEL WIRE	
IC10	PQLP10293Z	RF UNIT	
F1	K5H302Y00003	FUSE	
P1	PFRT002	THERMISTOR	S
RA1	EXB28VR000X	RESISTOR ARRAY	
X1	H0J103500022	CRYSTAL OSCILLATOR (*1)	

15.5.1.3. Operational P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PQWP2G8220EH	OPERATIONAL P.C. BOARD ASS'Y (RTL)	
		(DIODES)	
LED1	PQVDBR1111C	LED	S

Ref. No.	Part No.	Part Name & Description	Remarks
LED2	PQVDBR1111C	LED	S

15.5.2. Handset

15.5.2.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGP10327Z1	PANEL, LCD	AS-HB
102	PQGG10421Y4	GRILL, BUTTON	ABS-HB
103	PQHS10778Z	TAPE, DOUBLE SIDED	
104	PQGS10004Z	NET, RECEIVER SHEET	
105	PQKM10769Y5	CABINET BODY	ABS-HB
106	PQHS10781Z	COVER, RECEIVER NET	
107	L0AD01A00014	RECEIVER	
108	PQHG10756Z	RUBBER PARTS, RECEIVER	
109	PQWHTGA820ER	RECEIVER ASS'Y	
110	PQHS10780Z	SPACER, LCD CUSHION	
111	PQYT10022Z1	KEYBOARD SWITCH	
112	PQLP10312Z	LIQUID CRYSTAL DISPLAY	
113	PQBC10427Z2	BUTTON, JOYSTICK	ABS-HB
114	PQSA10207Z	ANTENNA	
115	PQJT10254Z	CHARGE TERMINAL (R)	
116	PQJT10253Z	CHARGE TERMINAL (L)	
117	PQHR11315Z	GUIDE, SPEAKER	ABS-HB
118	L0AA02A00048	SPEAKER	
119	PQHS10784Z	SPACER, SPEAKER NET	
120	PQJC10056X	BATTERY TERMINAL	
121	PQKE10480Z1	COVER, E/P	ELAS-TOMER-HB
122	PQKF10749Z1	CABINET COVER	ABS-HB
123	PQQT23182Z	LABEL, ATTENTION	
124	PQQT23469Z	LABEL, BATTERY	
125	PQHS10782Z	SPACER, BATTERY COVER	
126	PQKK10604Z1	LID, BATTERY COVER	ABS-HB
127	PQYNTG8200EB	LID, BATTERY COVER ASS'Y	ABS-HB
128	PQGT19902Z	NAME PLATE	

15.5.2.2. Main P.C.Board Parts

Note:

(*1) When replacing IC1, IC3 or X1, make the adjustment using PQZZTG8231M. Refer to **Handset** (P.65) of **Things to Do after Replacing IC or X'tal**.

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPTGA820BR	MAIN P.C. BOARD ASS'Y (RTL)	
		(ICs)	
IC1	C1CB00002775	IC (BBIC (QFP)) (*1)	
IC3	PQWITGA820BR	IC (EEPROM) (*1)	
		(TRANSISTORS)	
Q1	PQVTFDN335N	TRANSISTOR(SI)	S
Q2	B1ADGE000004	TRANSISTOR(SI)	
Q3	B1ADGE000004	TRANSISTOR(SI)	
Q4	2SB766ARTX	TRANSISTOR(SI)	S
Q5	UNR9216J0L	TRANSISTOR(SI)	
Q7	UN9219J	TRANSISTOR(SI)	S
Q9	UN9219J	TRANSISTOR(SI)	S
Q12	UN9219J	TRANSISTOR(SI)	S
Q23	2SD1819A-TX	TRANSISTOR(SI)	S
		(DIODES)	
D1	B0JCME000035	DIODE(SI)	
D7	MA2Z72000	DIODE(SI)	
LED4	B3ACB0000133	LED	
LED5	B3ACB0000133	LED	
LED6	B3ACB0000133	LED	
LED7	B3ACB0000133	LED	
LED8	B3ACB0000133	LED	
LED9	B3ACB0000133	LED	
LED10	B3ACB0000133	LED	
LED11	B3ACB0000133	LED	
		(COILS)	
L1	G1C470M00025	COIL	
F1	PQLQR2M5N6K	COIL	S
		(IC FILTERS)	
L7	J0JCC0000275	IC FILTER	
L21	J0JCC0000286	IC FILTER	
L22	J0JCC0000277	IC FILTER	
L23	J0JCC0000276	IC FILTER	
		(CONNECTOR AND JACK)	
CN3	K1MN13BA0134	CONNECTOR	
CN4	K2HD103D0001	JACK	
		(COMPONENTS PARTS)	
RA3	D1H447120002	RESISTOR ARRAY	
RA4	D1H447120002	RESISTOR ARRAY	
RA5	D1H447120002	RESISTOR ARRAY	
RA6	D1H447120002	RESISTOR ARRAY	
		(VARISTORS)	
D8	D4ED1270A014	VARISTOR	
C70	D4ED1270A014	VARISTOR	
C71	D4ED1270A014	VARISTOR	
C101	D4ED1270A014	VARISTOR	
C102	D4ED1270A014	VARISTOR	
		(RESISTORS)	
R1	ERJ6RSJR10V	0.1	
R2	ERJ3GEYJ680	68	
R5	ERJ2GEJ471	470	
R6	ERJ3GEYJ103	10K	
R7	ERJ3GEYJ224	220K	
R11	ERJ2GEJ393X	39K	
R12	ERJ2GEJ4R7	4.7	
R13	ERJ2GEJ101	100	
R15	ERJ2GEJ332	3.3K	
R23	ERJ2GEJ471	470	
R24	ERJ2GEJ332	3.3K	
R25	ERJ2GEJ222	2.2K	
R32	ERJ2GEJ104	100K	
R33	ERJ2GEJ104	100K	
R40	ERJ2GEJ103	10K	
R41	ERJ2GEJ103	10K	
R45	ERJ6RSJR10V	0.1	
R46	ERJ2GEJ562X	5.6K	
R47	ERJ2GEJ562X	5.6K	
R52	ERJ2GEJ102	1K	
R61	ERJ2GEJ102	1K	
R62	ERJ2GEJ102	1K	
R63	ERJ2GEJ101	100	
R64	ERJ2GEJ103	10K	
R65	ERJ2GEJ103	10K	
R66	ERJ2GEJ102	1K	
R71	ERJ3GEYJ470	47	
R103	ERJ2GEJ101	100	
R104	ERJ2GEJ101	100	
R105	ERJ2GEJ101	100	
R106	ERJ2GEJ101	100	
R107	ERJ2GEJ101	100	
R151	ERJ2GEJ681	680	
R153	ERJ2GE0R00	0	
R157	ERJ2GE0R00	0	
R158	ERJ2GE0R00	0	
R167	ERJ2GE0R00	0	
R170	ERJ2GEJ331	330	
R175	ERJ2GE0R00	0	
R176	ERJ2GE0R00	0	
R181	ERJ2GE0R00	0	
R182	ERJ3GEY0R00	0	
R183	ERJ2GEJ103	10K	
R186	ERJ2GE0R00	0	
R192	ERJ2GE0R00	0	
R196	ERJ2GE0R00	0	
R197	ERJ2GEJ473	47K	
R199	ERJ2GEJ473	47K	
R200	ERJ2GEJ473	47K	

Ref. No.	Part No.	Part Name & Description	Remarks
R201	ERJ2GEJ104	100K	
		(CAPACITORS)	
C1	EEE0GA331WP	330	
C2	EEE0JA331P	330	
C3	ECUE1A104KBQ	0.1	
C6	ECUE1H8R0DCQ	8P	
C7	ECUE1H120JCQ	12P	
C8	ECUE1A224KBQ	0.22	
C10	ECUV1A225KB	2.2	
C11	ECUE1A104KBQ	0.1	
C12	ECST0JY226	22	S
C14	ECUE1H100DCQ	10P	
C15	ECUV1A105KBV	1	
C18	ECUE1H102KBQ	0.001	
C19	ECUE0J105KBQ	1	
C20	ECUE1A104KBQ	0.1	
C21	ECUE1A104KBQ	0.1	
C22	ECUE0J105KBQ	1	
C23	ECUE1H101JCQ	100P	
C24	ECUE1A104KBQ	0.1	
C25	ECUE1A104KBQ	0.1	
C26	ECUV1C104KBV	0.1	
C27	ECUE0J105KBQ	1	
C29	ECUV1A105KBV	1	
C30	ECUE1A104KBQ	0.1	
C34	ECUE0J105KBQ	1	
C35	ECUE1H101JCQ	100P	
C36	ECUE1H102KBQ	0.001	
C38	ECUE1C103KBQ	0.01	
C39	ECUV1A225KB	2.2	
C52	ECUE1H102KBQ	0.001	
C53	ECUE1H151JCQ	150P	
C57	ECUE1H390JCQ	39P	
C59	ECUE1H100DCQ	10P	
C62	ECUE1H100DCQ	10P	
C72	ECUE1H100DCQ	10P	
C84	ECUE1A104KBQ	0.1	
C86	F3F0J4760005	47	
C98	ECUE1H102KBQ	0.001	
C103	ECUE1H101JCQ	100P	
C104	ECUE1H101JCQ	100P	
C105	ECUE1H101JCQ	100P	
C107	ECUE1H101JCQ	100P	
C119	ECUE1A104KBQ	0.1	
C120	ECUE1C103KBQ	0.01	
C121	ECUE1A104KBQ	0.1	
C122	ECUE1H100DCQ	10P	
C163	ECUE1H100DCQ	10P	
C165	ECUE1H3R0CCQ	3P	
C166	ECUE1H471KBQ	470P	
C168	ECUE1A104KBQ	0.1	
C173	ECUE1H101JCQ	100P	
C174	ECUE1H101JCQ	100P	
C175	ECUE1H101JCQ	100P	
C176	ECUE1H101JCQ	100P	
C177	ECUE1H151JCQ	150P	
C178	ECUE1H100DCQ	10P	
C179	ECUV1H100DCV	10P	
C180	ECUE1H331KBQ	330P	
		(OTHERS)	
MIC	L0CBAB000104	MICROPHONE	
E101	PQWE10050Z	BATTERY TERMINAL	ABS-HB
E102	PQSE10033Z	SPECIAL SWITCH, SHEET	
IC4	PQLP10293Z	RF UNIT	
SW1	K0C115A00006	SEESAW SWITCH	
X1	H0J103500024	CRYSTAL OSCILLATOR (*1)	

15.5.3. Charger Unit

15.5.3.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
200	PQLV30056YB	CHARGER UNIT ASS'Y (RTL)	S
200-1	PQGP10330Z1	PANEL	AS-HB
200-2	PQHS10779Z	TAPE, DOUBLE SIDED	
200-3	PQKM10768Z1	CABINET BODY	ABS-HB
200-4	PQJT10252Y	CHARGE TERMINAL	
200-5	PQKF10748Y1	CABINET COVER	PS-HB
200-6	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
200-7	PQGT19903Z	NAME PLATE	S

15.5.3.2. Main P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB200	PQWPTGA721CH	MAIN P.C. BOARD ASS'Y (RTL)	
		(DIODE)	
D1	B0JAME000095	DIODE(SI)	
		(JACK)	
J1	K2ECYB000001	JACK	S
		(RESISTOR)	
R1	ERG2SJ100E	10	
		(FUSE)	
F1	K5H302Y00003	FUSE	

15.5.4. Accessories and Packing Materials

Note:

(*1) You can download and refer to the operating instructions (Instruction book) on TSN server.

15.5.4.1. KX-TG8231B

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV207V	AC ADAPTOR	⚠
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PQQX16247Z	INSTRUCTION BOOK (*1)	
A4	PQQW15858Z	LEAFLET, QUICK GUIDE (for English)	
A5	PQQW15859Z	LEAFLET, QUICK GUIDE (for Spanish)	
A6	PQKE10481Z1	HANGER, BELT CLIP	PC+ABS-HB
P1	PQPH10103Z	PROTECTION COVER (for Base Unit)	
P2	PQPH10088Z	PROTECTION COVER (for Handset)	
P3	PQPK16040Z	GIFT BOX	
P4	PQXDDS400-8	MAGNET ELECTRIC TRANSDUCER, SECURITY TAG	

15.5.4.2. KX-TG8232B

Ref. No.	Part No.	Part Name & Description	Remarks
A101	PQLV207V	AC ADAPTOR (for Base Unit)	⚠
A102	PQLV209V	AC ADAPTOR (for Charger Unit)	⚠
A103	PQJA10075Z	CORD, TELEPHONE	
A104	PQQX16247Z	INSTRUCTION BOOK (*1)	
A105	PQQW15858Z	LEAFLET, QUICK GUIDE (for English)	
A106	PQQW15859Z	LEAFLET, QUICK GUIDE (for Spanish)	
A107	PQQV10494Z	CARD, CCP	
A108	PQKE10481Z1	HANGER, BELT CLIP	PC+ABS-HB
P101	PQPH10103Z	PROTECTION COVER (for Base Unit)	

Ref. No.	Part No.	Part Name & Description	Remarks
P102	PQPH10088Z	PROTECTION COVER (for Handset)	
P103	PQPH10101Z	PROTECTION COVER (for Charger Unit)	
P104	PQPK16041Z	GIFT BOX	
P105	PQXDDS400-8	MAGNET ELECTRIC TRANSDUCER, SECURITY TAG	

15.5.4.3. KX-TGA820B

Ref. No.	Part No.	Part Name & Description	Remarks
A201	PQLV209V	AC ADAPTOR	⚠
A202	PQQX16156Z	INSTRUCTION BOOK (*1)	
A203	PQQW15385Z	LEAFLET, #800	
A204	PQKE10481Z1	HANGER, BELT CLIP	PC+ABS-HB
P201	PQPH10101Z	PROTECTION COVER (for Charger Unit)	
P202	PQPH10088Z	PROTECTION COVER (for Handset)	
P203	PQPK16042Y	GIFT BOX	
P204	PQXDDS400-8	MAGNET ELECTRIC TRANSDUCER, SECURITY TAG	

15.5.5. Screws

Ref. No.	Part No.	Part Name & Description	Remarks
A	XTW26+T8PFJ	TAPPING SCREW	
B	XTW26+T12PFJ	TAPPING SCREW	
C	XTW2+R8PFJ	TAPPING SCREW	
D	XTW2+R10PFJ	TAPPING SCREW	

15.5.6. Fixtures and Tools

Note:

(*1) See **The Setting Method of JIG (Base Unit)** (P.58), and **The Setting Method of JIG (Handset)** (P.62).

Part No.	Part Name & Description	Remarks
PQZZ1CD300E	JIG CABLE (*1)	
PQZZTG8231M	BATCH FILE CD-ROM (*1)	

G/N
KXTG8231B
KXTG8232B
KXTGA820B